

A TAXONOMIC REVISION OF THE GENUS ARTHRAUXON BEAUV. (GRAMINEAE).

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SUMMARY

A world-revision of *Arthraxon* Beauv. (Gramineae) is presented. Three wide-spread species, *A. hispidus* (Thunb.) Makino, *A. lanceolatus* (Roxb.) Hochst., and *A. lancifolius* (Trin.) Hochst. are very variable and have caused the description of a great number of taxa, most of which are here reduced to synonymy. There are now 7 species and 9 varieties; for 6 of the latter new combinations are proposed. No new taxa are described.

INTRODUCTION

Palisot de Beauvois described *Arthraxon* in 1812, on the single species *A. ciliaris*, based on a cultivated specimen from the Trianon-garden in France, comparing it with *Ischaemum ciliare* Retz. (1791). This comparison has caused several authors (Kunth, 1831; Steudel, 1854) to include *A. ciliaris* in *Ischaemum ciliare*, and to describe a new genus, i.e. *Lucaea* Kunth. The name *Arthraxon* refers to the articulated axis of the inflorescence.

The genus *Arthraxon*, under whatever name, is distinct by its cordate, amplexicaul leaves (whereby it immediately can be distinguished from *Microstegium* Lindl., with which it is often confused), and by having lemmas with a subbasal awn. The species of *Arthraxon* are very complex and often widespread heteromorphic taxa, especially *A. hispidus* (Thunb.) Makino, *A. lanceolatus* (Roxb.) Hochst., and *A. lancifolius* (Trin.) Hochst., which has caused in the course of time the description of a huge amount of different taxa. A number of names are further due to misinterpretations of the construction of the spikelets (Fig. 1), which are two-flowered, with the lower and upper flower reduced to the lemma only (except for two species, *A. castratus* Bor and *A. depressus* Fischer, which still possess a palea in the upper flower). The lower flower is sterile, the upper is bisexual and has an awned lemma; the awn is sometimes reduced and even exceptionally absent. Both glumes are more or less chartaceous; the lemmas, however, are very thin and membraneous and are easily torn into two, especially in careless dissection. Such a torn lemma is then often mistaken for a lemma and a palea (Beauvois, 1812, cf. figure; Hochstetter, 1856). Other authors have thought that the spikelet was one-flowered, with the lower lemma or the awnless upper lemma as the palea. For this reason Steudel (1853) described a separate genus *Lasiolytrum* in the tribe *Phalarideae*, while simultaneously he had species of *Arthraxon* under *Andropogon* L. and *Lucaea* Kunth.

The name *Arthraxon* has long been overlooked, or its identity was mistaken. Trinius (1822) described *Pleuroplitis*, which he did not identify with *Arthraxon*, the

genus mentioned next by him, because he thought (see also Bor, 1972) that the lower flower consisted of an awn only, and that the upper flower had a lemma, as well as a palea. He did not notice that the awn was actually a part of the upper lemma. Later on he recognized his error, and sunk *Pleuroplitis langsdorffii* Trin. into the synonymy of *Andropogon amplexifolius* Trin. (1832), which is now regarded as a synonym of *Arthraxon hispidus* var. *hispidus*. But he still did not realize that *Arthraxon ciliaris* Beauv. (now also a synonym of *A. hispidus* var. *hispidus*) was the same.

Hochstetter (1856) was the first to realize that *Arthraxon* and *Pleuroplitis* were identical, and that other genera, such as his own *Psilopogon* (1846), a *nomen nudum*, and *Lucaea* Kunth (1831), *Batratherum* Nees (1835), and *Alectoridia* A. Rich. (1851) also belonged to *Arthraxon*. After a rambling discourse he made all new combinations necessary in *Arthraxon* (see also paragraph 'Nomenclature').

Regel (1866) made another full account of the genus, but he again failed to recognize it as *Arthraxon* and used *Pleuroplitis* instead, describing several new taxa and making some new combinations. After Regel, revisions of *Arthraxon*, under that name, were made by Hackel (1889) and by Jain (1972). The first author gave excellent descriptions, but unfortunately saw too few specimens, and was therefore not aware of the extreme variability present in some of the species. He thus thought he could distinguish more taxa than is possible now. After Hackel's famous book the name *Arthraxon* became firmly rooted. Jain's revision dealt with the Indian taxa; he gave a full account of all new names and combinations, and some of the most important old ones. Unfortunately, Jain and I have a different approach to this genus: Jain has distinguished a great number of taxa, most of which I have been unable to separate after extensive and careful study of as much material as possible.

TAXONOMY

Arthraxon is placed by Pilger (1954) in the subfamily *Andropogonoideae*, and in the tribe *Andropogoneae* (e.g. Stapf, 1917; Camus, 1922; Pilger, 1954; Hitchcock & Chase, 1950; C. E. Hubbard, 1973). On a lower taxonomic level differentiation in opinions appears: Pilger and C. E. Hubbard put *Arthraxon* in the subtribe *Andropogoninae*, while Clayton (1972) places it in the subtribe *Arthraxoninae*, a name first used by Bentham ('*Arthraxeae*', 1882). Stapf, Jacques-Félix (1962), and Clayton even use the term *Arthraxonastrae* for distinction on a level between subtribe and genus. A thorough investigation on the supra-generic levels was beyond the scope of the present study. However, it may be concluded that *Arthraxon*, although obviously an Andropogonoid genus, is a very distinct, natural genus without clear affinities.

Besides supra-generic names, also a number of infra-generic names has been attributed to *Arthraxon*. *Arthraxon* has some very heterogeneous taxa, and as a result a lot of species have been described. Therefore infra-generic names appeared useful for good order.

Regel (1866) described three sections, and named them after the genera placed by him in the synonymy of *Pleuroplitis* (thus omitting to name one of them *Pleuroplitis*). He used for his infra-generic system the presence or absence of the pedicelled spikelet and the length of the stipe when the pedicelled spikelet was absent. But within my concept of the species this character shows overlap (*A.*

hispidus for instance, normally with sessile spikelets only, rarely also has pedicelled spikelets. Furthermore, there are no disjunctions in the length of the stipe in any species). His division is therefore not practical, nor natural (for instance *Pleuroplitis quartiniana* and *P. langsdorffii* are placed in two different sections, but both are in my concept synonyms of *A. hispidus* var. *hispidus*).

Hackel (1889) gave another subgeneric division: all species, except one, belong to the subgenus *Pleuroplitis*, while *A. jubatus* Hack. belongs to the subgenus *Trichatherum*. However, if *A. jubatus* is honoured with a private subgenus, there seems to be hardly any reason not to distinguish a subgenus for nearly each of all other species (in my concept) as well, which is hardly sensible. Hackel's use of the *Triandri* against the *Diandri* is not, as some have thought, a subgeneric division, but merely part of his key; besides, this character would be unusuable as the species, in as well his as my concept, show overlap again: species with 2 anthers per spikelet occasionally may have 3 and vice-versa.

Tzvelev (1963) described the series *Hispidi*. But as no other series is described by him, it is unclear to me how others can be distinguished from it and the argument, mentioned above, concerning Hackel's system applies anyway.

The above may have made clear that subgeneric divisions within *Arthraxon* are unwarranted. Nevertheless, some remarks on the apparent groupings may be made.

As far as the vegetative characters are concerned all species are very similar, only *A. hispidus* var. *robustior* Welzen is conspicuous for its large culms and leaves. In the other cases spikelets are necessary for identification. The phylogenetically most important characters are presence or absence of the pedicelled spikelet and of the palea, and the number of anthers per spikelet (but this may be variable even within some species!). Additional characters can be found in the key.

Arthraxon castratus Bor and *A. depressus* Fischer share some characters which may be regarded as basic in the andropogonoid grasses: palea present, stamens 3; but the pedicelled spikelets are absent, which must be considered as derived. Moreover, they are similar in the presence of an upper glume with a narrow membranous margin and lemmas with pilose margins, while the other species of the genus have an upper glume with a broad margin and glabrous lemmas. Whether this points at a true relationship between the two, I do not dare to say, but it is suggestive.

A. depressus otherwise resembles *A. hispidus* Makino in the shape of the spikelet and is thereby somewhat intermediary between the latter and *A. castratus*.

A. hispidus and the remaining species could be arranged in various groups, based on the presence or absence of the pedicelled spikelets and the number of stamens (2 or 3) per flower (they all lack the palea), but no satisfactory result can be achieved, which demonstrates the reticulate affinities among the species.

A. jubatus is immediately distinct from all species by the presence of the very long awn. By the presence of pedicelled spikelets and 3 stamens it is similar to *A. lanceolatus*, from which species it is otherwise quite different in the armament of the lower glume of the sessile spikelet. As the general aspect of the two species is very dissimilar, it does not seem likely that *A. jubatus* with its local distribution has been derived from the wide-spread *A. lanceolatus*.

Besides in having pedicelled spikelets and 3 stamens, *A. lanceolatus* is different from all other species by the very broad-based spicules on at least the marginal and submarginal nerves of the lower glume of the sessile spikelets, which in the var. *villosus* Welzen are even fused into a wing on the marginal nerves.

The two remaining species, *A. microphyllus* (Trin.) Hochst. and *A. lancifolius* (Trin.) Hochst., always have 2 stamens only. Pedicelled spikelets are usually present, although in *A. lancifolius* restricted to the upper part of the inflorescence; in some cases they are absent in herbarium material, either because they were never developed, or because the upper part has disarticulated and is lost.

A. microphyllus is clearly closely related to *A. lancifolius* and differs mainly by the presence of pedicelled spikelets throughout the inflorescence and by the protruding nerves of the lower glumes of both the sessile and the pedicelled spikelets. Because of these characters which are only observed in a small area, while *A. lancifolius* is widespread, it did not seem likely that *A. microphyllus* would be a mere form of *A. lancifolius*. They are so striking that I am of the opinion that it is a distinct species; this is in agreement with Bor (1972), who described it as *A. sikkimensis* (see also note sub *A. microphyllus*). The species most similar to these two seems to be *A. hispidus* as far as the spikelets are concerned, which resemble small versions of the latter. They therefore seem closer to *A. hispidus* than *A. depressus*.

It will be clear from the above that infra-generic taxa cannot be distinguished. Chromosome-numbers do not help much to distinguish either these or separate species. Only diploids ($n=9$) or tetraploids ($n=18$) are mentioned in literature next to some doubtful counts, perhaps due to misprints (see sub generic and species descriptions). It is rather surprising to note that even in the very polymorphic species no higher polyploids have been observed.

MORPHOLOGY

Some terms used in the following descriptions need some explanation, especially as different descriptive terms are used in the literature.

The margins of the leaf-blades bear basally bulbous-based hairs (fig. 16a), and are upwards ciliate, with very small thorn-like structures, here called spicules (fig. 16b). The term ciliate is, however, often used in literature to describe the bulbous-based hairs.

The inflorescence is rather complex. It usually consists of two to many, often branching spikes, rarely only one, usually subdigitately arranged. The spikelets are alternate and laterally appressed against the rachis. The axis is articulated and joint and spikelets fall off easily, usually as one unit, thus forming a diaspore which most likely attaches itself easily to passing animals by means of the hairs on the joint, the spicules on the glumes, or the awn. In some species the sessile spikelet is accompanied by a pedicelled one, emerging from the callus, opposite to the joint. The pedicel, almost always present, often without a spikelet and then often minute, is called stipe.

The glumes possess spicules which, although usually minute, may be transformed into hair-like structures. *A. lanceolatus*, however, possesses very broad-based spicules on the lower glume of the sessile spikelet, which are fused into wings in var. *villosus*.

The length and the depth of the \pm chartaceous glumes and the membranous lemmas and paleas (the latter usually absent) are given.

The nerves, especially of the lemmas and the paleas are very indistinct, and usually not visible with a dissecting microscope at c. 32 X, as was used during this study. Therefore one should not be surprised if the term nerveless is used, but that at larger magnification faint traces will be observed.

The lower lemma has a perfect, geniculate awn, the lower part of which is called column and the upper part subule. The awn is measured when stretched after having been soaked.

Cleismogamy and chasmogamy, observed in every species, are discussed in note 3 sub *A. lancifolius*.

NOMENCLATURE

The name *Arthraxon* has, as will be observed from the synonymy given here, a number of apparently homotypic synonyms. The code stated (Art. 10.1) that 'the type of a name of a genus... is a species', while according to Art. 63.1 names are superfluous if the type of a name which ought to have been adopted is included. It would therefore seem that *Alectoridia*, *Batratherum*, *Lasiolytrum*, *Lucaea*, and *Pleuroplitis*, of which the names of the types are synonymous with *A. hispidus* (and even its var. *hispidus*) should be regarded as superfluous, and all combinations in them therefore as illegitimate (cf. Art. 66, 68). This strict application of the rules has apparently not been realized and therefore not followed. According to a recent article by Nicolson (1979) a special committee to look into this question has been established. He suggested that it might be better to regard the name of a species, rather than a species, as the type of a generic name. Until this matter is solved, it seems best to follow common usage, even if it is actually against a certain too sharp interpretation of the wording of some of the rules.

Another nomenclatorial problem has been caused by Hochstetter (1856) who listed many species of *Arthraxon*. In his treatment he heavily criticized their treatment under *Andropogon*, *Lasiolytrum* and *Lucaea* by Steudel in his Synopsis (1854), so Hochstetter was obviously very well aware of their presence in the latter work. For the individual species, however, he does not refer directly to them, although in several cases they are obviously the basionyms of his new combinations in *Arthraxon*. Strictly speaking it might be argued that all his names are therefore mere nomina nuda and his combinations invalid. On the other hand it is very clear which taxa are intended, because of the references to Nees' epithets, which were also cited by Steudel, and because Steudel as well as Hochstetter cited the same collections. As generally Hochstetter's combinations have been regarded as valid it seems most logical to be consistent with this use and therefore they are accepted here as valid through admittedly very circumstantial evidence. If others disagree I gladly leave it to them to figure out who were the subsequent validating authors to be cited instead, or which hetero-typic epithets should be used instead.

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- Lucaea* Kunth, Rev. Gram. 2 (1831) 489. — *Pleuroplitis* Trin. sect. *Lucaea* Regel, Bull. Ac. St. Petersb. 10 (1866) 371, *nom. ill.* — T y p e: *L. gracilis* Kunth [= *A. hispidus* (Thunb.) Makino var. *hispidus*].
- Batratherum* Nees, Edinb. New Phil. J. 18 (1835) 180 — L e c t o t y p e: *B. micans* Nees, here proposed [= *A. hispidus* (Thunb.) Makino var. *hispidus*].
- Lasiolytrum* Steud., Flora 29 (1846) 18. — T y p e: *L. hispidum* (Thunb.) Steud. [= *A. hispidus* (Thunb.) Makino var. *hispidus*].
- Alectoridia* A. Rich., Tent. Fl. Abyss. 2 (1851) 447. — *Pleuroplitis* Trin. sect. *Alectoridia* Regel, Bull. Ac. St. Petersb. 10 (1866) 375. — T y p e: *Alectoridia quartiniana* A. Rich. [= *Arthraxon hispidus* (Thunb.) Makino var. *hispidus*].
- [*Psilopogon* Hochst., Flora 29 (1846) 117, *nom.*] — *Pleuroplitis* Trin. sect. *Psilopogon* Regel, Bull. Ac. St. Petersb. 10 (1866) 369. — T y p e: *Ps. schimperi* Hochst. [*pro Schimper* 96b = *A. lancifolius* (Trin.) Hochst.]. See also Nomina excludenda sub *Ps. capensis*.
- Arthraxon* Beauv. subgen. *Trichatherum* Hack., Mon. Androp. (1889) 358, 710. — T y p e: *A. jubatus* Hack.
- Arthraxon* Beauv. series *Hispidi* Tzvel., Not. Syst. U.R.S.S. 22 (1963) 53. — T y p e: *A. hispidus* (Thunb.) Makino (var. *hispidus*).

Annual or perennial herbs, slender to robust, branching intra-vaginally at the sometimes bulbous base and often also in nearly every node. Cataphylls rarely

present. *Culms* geniculately ascending, usually rooting in the decumbent nodes, glabrous to sometimes pubescent at base, smooth. *Sheaths* slightly inflated, especially the uppermost, glabrous to hairy all over, at least the outer margin always with usually bulbous-based hairs. Ligule collar-shaped; margin erosely truncate, usually fimbriate. *Blades* ovate-oblong to ovate-linear-lanceolate; base (slightly) cordate, (slightly) hemi-amplexicaul; margins slightly cartilaginous with bulbous-based hairs usually at least at base, becoming ciliate upwards; apex acute to acuminate. *Peduncle* smooth. *Inflorescence* obconical, usually subdigitate, with 2 — many branches, rarely a solitary spike only; branches simple or with a few secondary branches, disarticulating, with 1 — many spikelets; joints scabridulous. *Spikelets* often in pairs, the sessile ♀, the pedicelled (when present) sterile or ♂, sometimes yawning at anthesis, laterally compressed, asymmetrical in lateral view. Sessile spikelets 2-flowered, lower flower sterile, the upper ♀, green to reddish purple; callus short, truncate. Glumes equal or unequal, ovate-linear-lanceolate, apex acute to erose; lower glume slightly to distinctly rounded on the back, nerves with small or broad-based, short or long spicules, marginal nerves sometimes pilose or winged; margins sometimes inflexed, chartaceous to chitinous; upper glume with a chartaceous keel, midrib in upper 0.3–0.8th part with aristate spicules, which distally increase in size, sometimes laterally with a row of smaller ones; margins membranous, sometimes with a few patent to retrorse white hairs. *Lemmas* ovate-lanceolate, rounded on the back, apex acute to erose, smooth, glabrous (margins sometimes excepted), membranous, pale to green to reddish purple suffused; lower lemma awnless, 0- or 1-nerved; upper lemma 1- or 3-nerved, awn inserted in the lower 0.15th part of lemma, rarely higher up, geniculate, rarely straight, sometimes enclosed or absent, brown to purple (in vivo); column contorted, glabrous, usually smooth; subule slightly contorted, glabrous, scabridulous. *Palea* usually absent, when present ± triangular, subacute, membranous, pale. *Lodicules* ob-trapezoid, margin erose, many-nerved, glabrous. *Anthers* 2 or 3, reddish purple (in vivo). *Styles* apical, free, stigmas plumose. *Caryopsis* slightly ovoid-ellipsoid to cylindrical, somewhat laterally compressed; embryo 0.3–0.5 times as long as the caryopsis; hilum subbasal, punctiform. *Pedicelled spikelet* usually reduced to the sometimes microscopic pedicel ('stipe'), when present often reduced to a vestigial ovate-lanceolate to linear glume, sometimes well-developed. Callus absent. *Glumes* equal or unequal, ovate-linear-lanceolate to linear, apex acute to erose, herbaceous (except sometimes for the membranous margins); lower glume rounded on the back, scabridulous to spiculate; upper glume when present dorsally keeled, sometimes flattened, midrib shortly spiculate. *Lemmas* when present ovate-linear-lanceolate, awnless, membranous, pale to green to reddish purple suffused. *Palea* absent. *Lodicules* when present ob-trapezoid, margin erose, many-nerved, glabrous. *Anthers* when present 2 or 3, reddish purple.

D i s t r i b u t i o n: Seven species, of which three wide-spread in Africa (mainly central and eastern part), Caucasus, South and South-East Asia towards North China and South-East Russia, Japan, Malesia (except Borneo), East-Central Australia, and Eastern North and Central America. The other four in India, one also found in South Vietnam and Java.

E c o l o g y: Usually found on waste places without much disturbance, like left plantations and roadsides. Usually on dry, often poor soil.

C h r o m o s o m e n u m b e r s: $x=9$, but some curious other counts have been

made, e.g. *A. castratus* (n=8), *A. hispidus* var. *hispidus* (n=5), *A. lanceolatus* var. *lanceolatus* (n=8), *A. lancifolius* (n=10).

KEY TO THE TAXA.

- 1a. Awn up to 2.3 cm long, sometimes enclosed or completely absent; column smooth. 2
- b. Awn 7.5–14 cm long; column scabridulous 4. ***A. jubatus***
- 2a. Margins of the lower glume of the sessile spikelet inflexed, at least the marginal nerves with broad-based spicules or with wings. Pedicelled spikelet well-developed, 2.7–7.8 mm. 3
- b. Margins of the lower glume of the sessile spikelet flat, not inflexed, marginal nerves with small spicules, never winged. Pedicelled spikelet absent or usually very reduced, if completely present at most up to 3.2 mm long. 7
- 3a. Marginal nerves of the lower glume of the sessile spikelet with hairy wings. 5e. ***A. lanceolatus* var. *villosus***
- b. At least the marginal nerves of the lower glume of the sessile spikelet with broad-based spicules. 4
- 4a. Broad-based spicules on at least the marginal and submarginal nerves of the lower glume of the sessile spikelet with at most a single stiff hair. 5
- b. Broad-based spicules on the marginal and submarginal nerves of the lower glume of the sessile spikelet with bundles of stiff hairs. 6
- 5a. Marginal and submarginal nerves of the lower glume of the sessile spikelet with broad-based spicules. 5a. ***A. lanceolatus* var. *lanceolatus***
- b. All nerves of the lower glume of the sessile spikelet with broad-based spicules. 5b. ***A. lanceolatus* var. *echinatus***
- 6a. Lower glume of the sessile spikelet dorsally shortly spiculate, glabrous. 5c. ***A. lanceolatus* var. *meeboldii***
- b. Lower glume of the sessile spikelet dorsally densely pilose. 5d. ***A. lanceolatus* var. *raizadae***
- 7a. Joints, at least the upper ones, often long pilose. Sessile spikelet narrow, 0.3–1.1 mm wide; upper glume with an acuminate to erose, sometimes short-to long-awned apex. Pedicelled spikelets usually present in at least the upper part of the inflorescence and then represented by at least a well-developed lower glume, rarely absent (stipe still present). 8
- b. Joints glabrous to short pilose, rarely long pilose (like the robust *A. hispidus* var. *santapaui*). Sessile spikelet usually relatively broad, 0.3–2 mm wide; upper glume with an acuminate to erose apex, but never awned. Pedicelled spikelet usually absent (stipe still present), rarely present, then reduced to a vestigial lower glume. 9
- 8a. Spikelets if paired then only in the upper part of the inflorescence. Nerves of the lower glume of the sessile spikelet indistinct. Pedicelled spikelets if present ovate-linear-lanceolate. 6. ***A. lancifolius***
- b. Spikelets all paired. Nerves of the lower glume of the sessile spikelet somewhat protruding. Pedicelled spikelet narrowly linear. 7. ***A. microphyllus***
- 9a. Upper glume with relatively narrow, 0.1–0.3 mm wide membranous margins. Margins of the lemmas pilose. Palea present. Anthers 3. 10
- b. Upper glume with relatively broad, 0.1–1 mm wide membranous margins.

- Margins of the lemmas glabrous. Palea absent. Anthers 2, rarely 3 (like *A. hispidus* var. *robustior*). 11
- 10a. Spikelets with a \pm rectangular base, chitinous; lower glume spiculate. 11
1. *A. castratus*
- b. Spikelets with a more or less cuneate base, chartaceous; lower glume smooth. 12
2. *A. depressus*
- 11a. Plants slender. Blades small, 0.6–7.4 by 0.2–1.5 cm, margins usually in lower 0.3th with bulbous-based hairs. Peduncle 0.15–0.8 mm \varnothing . Anthers 2, rarely 3. 12
- b. Plants rather coarse. Blades large, 4.5–19.5 by 0.9–2.2 cm, margins at least in lower 0.8th part with bulbous-based hairs. Peduncle 0.6–1.3 mm \varnothing . Anthers 3, rarely 2. 3c. *A. hispidus* var. *robustior*
- 12a. Spikelets \pm large, ovate-lanceolate to ovate-linear-lanceolate, 1.9–7.9 by 0.4–1.5 mm. Lower lemma always present. 13
- b. Spikelets very small, ovate-oblong, 1–1.8 by 0.3–0.6 mm. Lower lemma sometimes absent. 3b. *A. hispidus* var. *junnarensis*
- 13a. Spikelets widest just above the base. Joints 0.4 times as long as the spikelet, long-pilose. Lower glume usually densely spiculate. 3d. *A. hispidus* var. *santapauli*
- b. Spikelets widest in lower third. Joints 0.55–0.9 times as long as the spikelet, glabrous to short pilose to rarely long pilose. Lower glume usually not densely spiculate. 3a. *A. hispidus* var. *hispidus*

1. *Arthraxon castratus* (Griff.) Narayanaswami ex Bor. — Fig. 2, Map 1.

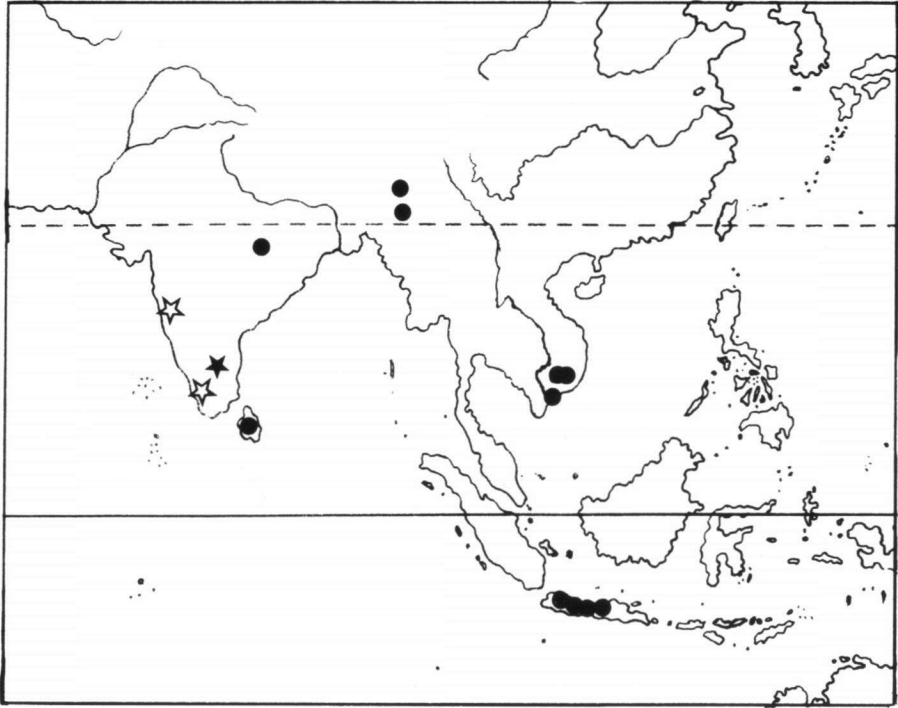
A. castratus (Griff.) Narayanaswami ex Bor, Fl. Assam 5 (1940) 376; Grasses (1960) 99; Jain, J. Ind. Bot. Soc. 51 (1972) 165, pl. 2; Gould & Soderstrom, Can. J. Bot. 52 (1974) 1085; Mehra & Kalra, Taxon 23 (1974) 806. — *Andropogon castratus* Griff., Notul. 3 (1851) 89. — T y p e: *Griffith* 292 (K) Suddayah in campis graminosis.

Andropogon rudis Nees ex Steud., Syn. 1 (1854) 383. — *A. rudis* Hochst., Flora 39 (1856) 188; Bor, Fl. Assam 5 (1940) 375. — T y p e: *Wallich* 8837 (P, n.v.; i s o in BM, K, W; IDC 7394) India, Silheti.

A. pilipes Back. in Heyne, Nutt. Pl. 1 (1922) 124; ed. 3, 1 (1950) 178; Back. & v. Slooten, Theconkr. (1924) pl. 39; Back., Handb. Fl. Java 2 (1928) 74; Monod de F. in Back. & Bakh.f., Fl. Java 3 (1968) 605. — T y p e not indicated, l e c t o: *Bakhuizen van den Brink* f. 2544 (L, here proposed; i s o in BO, n.v.) Java, Residentie Preanger, Tjidadap, Tjibelu. 1000 m alt.

[*A. dalatensis* A. Camus ex M. Schmid, Extr. Agron. Trop. 13 (1958) 199, nom.] — T y p e: *M. Schmid* 75 (Private Herbarium M. Schmid) Indo-Chine, Dalat, dans un ravin au milieu de la pinède. 1500 m alt.

Annual herb. Culms up to 55 (–120) cm high, glabrous; nodes glabrous. *Sheaths* glabrous to pilose all over, with bulbous-based hairs which increase in number distally. *Ligule* 0.8–1.2 (–1.8) mm high, hairs 0.15–0.3 mm long. *Blades* 2.1–7.3 by 0.5–1.1 cm, margins in lower 0.3th part with bulbous-based hairs, upwards ciliate, upper surface usually sparsely appressed-pilose, especially near the base and the margin, glabrescent to glabrous, \pm smooth, lower surface glabrous, very occasionally sparsely hairy, smooth. *Peduncle* 14–40 cm long, upwards becoming ascendingly appressed-white-pubescent. *Inflorescence* 1.1–7.1 by 0.5–3 cm, with 1–5 branches, with 4–47 spikelets, longest lowest branch 1.7–7.1 cm long; joints 4.1–7.2 mm long, densely appressed pubescent. Only sessile spikelets present, 4.1–7.2 by 0.9–2 mm, base \pm rectangular; callus with 0.3–1 mm long hairs. *Glumes* unequal, chitinous, except for the margins of the upper glume; lower glume



Map 1: Distribution of: ● = *A. castratus* (Griff.) Bor (taxon 1); ★ = *A. depressus* Fischer (taxon 2) and ☆ = *A. jubatus* Hack. (taxon 4).

rounded on the back, 3.3–6.8 by 0.6–1 mm, margins not inflexed, flat, 5–13 nerved, in the upper 0.6th part especially on the nerves with acute to bristle-pointed spicules, increasing in size distally, between the nerves with minute spicules; upper glume 4–7 by 1–1.6 mm, apex acuminate to erose, 3–9-nerved, with membranous margins 0.1–0.3 mm wide. *Lemmas* with long-pilose margins; lower lemma 3–5.3 by 0.5–1.3 mm, indistinctly 1-nerved; upper lemma 2.8–4.9 by 0.7–1 mm, 3-nerved; column with 8–12 coils, 5.8–9 mm long, smooth; subule 3.5–7 mm long. *Palea* 1.1–2.1 by 0.2–0.7 mm, margins pilose, indistinctly 2-nerved. *Lodicules* 0.3–0.6 by 0.3–0.5 mm. *Anthers* 3, 2–2.8 by 0.4–0.7 mm. *Styles* 2 mm long, stigmas 1.2 mm long. *Caryopsis* 2–2.3 by c. 0.9 mm. *Pedicelled spikelet* reduced to a 1.1–3.1 mm long pilose stipe.

Distribution: India (Madhya Pradesh, Assam, Manipur); Ceylon (Central prov.); Southern South Vietnam; Java (Bogor, Jakarta, Priangan, Pekalongan, Kedu).

Ecology: On sunny to slightly shaded road-sides, edges of bushes, in grasslands, scrubs, swamps, and in deserted teaplantations. Usually on moist, not very fertile soil. Rather rare, occasionally common. 240–1700 m alt.

Vernacular names: Java: *jukut hideung*, *tatamaganletik* (Sund.).

Use s: According to Backer (1950) probably of no to little importance as a fodder because of its rarity and its low feeding value.

Collector's notes: Culms reddish brown, spikes greyish green or brownish. Anthers and styles cacao-brown.

Chromosome numbers: $n=8$ (Mehra & Kalia, 1974, curious count); $n=18$ (Gould & Soderstrom, 1974).

Notes: 1) This species has a very peculiar, disjunct area. Two reasons might explain this. First, this taxon is rather rare and therefore has not been collected often. The second reason is more complicated. Two other species, *A. lanceolatus* and *A. lancifolius* show a distribution corresponding with areas with a seasonal drought; both species are not found in the everwet tropical rain-forests of Malesia (some dry pockets excluded). *A. castratus* seems to have a \pm similar preference, although data on labels generally point at moister localities of this species.

2) *A. camus*, who identified the plants sampled by A. Schmid in South Vietnam, thought that *Thelepogon elegans* was *Arthraxon rudis* (a synonym of *A. castratus*; see also nomina excludenda), and described the real *A. castratus* as *A. dalatensis* (unfortunately without a latin description).

3) See also note sub *A. depressus*.

2. *Arthraxon depressus* Stapf ex C. E. C. Fischer. — Fig. 3, Map 1.

A. depressus Stapf ex C. E. C. Fischer, Kew Bull. (1933) 349; Jain, J. Ind. Bot. Soc. 51 (1972) 165, pl. 3. — Type: *Wight KD 3372* (K; i s o in CAL, n.v.) India.

Annual herb, slender. *Culms* glabrous; nodes glabrous. *Sheaths* glabrous except for the bulbous-based hairs along at least the outer margin. *Ligule* 2–2.8 mm high; margin fimbriate. *Blades* 5–9 by 1–2.6 cm, margins with bulbous-based hairs in lower 0.8th part, becoming ciliate upwards; upper- and lower surface glabrous, smooth. *Peduncle* c. 17 cm long, upwards sometimes pilose, usually glabrous. *Inflorescence* 3.7–5.7 by 1.8–2.7 cm, with 2–4 branches, with c. 40 spikelets, longest lowest branches 2–5.6 cm long; joints 3.5–4.6 mm long, pubescent all over. *Sessile spikelets* c. 6.8 by 1.7 mm, base \pm cuneate; callus with c. 0.7 mm long white hairs. *Glumes* unequal, chartaceous, except for the margin of the upper glume; lower glume rounded on the back, c. 6.2 by 0.7 mm, margins not inflexed, flat, c. 7-nerved, smooth; upper glume c. 6.4 by 1.3 mm, margins c. 0.3 mm wide, apex acuminate to erose, inconspicuously 3-nerved. *Lemmas* with a pilose margin; lower lemma c. 5.6 by 0.6 mm; upper lemma c. 4.8 by 0.7 mm, awn geniculate, column with 11 coils, c. 6 mm long, smooth; subule c. 3.5 mm long. *Palea* c. 2.5 by 0.2 mm. *Lodicules* c. 0.4 by 0.4 mm. *Anthers* 3, c. 3.4 by 0.5 mm. *Styles* c. 1.9 mm long, stigmas c. 1.2 mm long. *Caryopsis* not seen. *Pedicelled spikelet* reduced to a 2.2–3.5 mm long pilose stipe, sometimes with a vestigial glume up to 0.25 mm long.

Distribution: India. Fischer mentions beside the type-specimen also *Meebold 10545* (n.v.) from Mysore state, Agalatti.

Ecology: Up to 1150 m alt.

Note: Stapf and Fischer thought that *A. depressus* was closely related to *A. lanceolatus*, but *A. depressus* lacks the pedicelled spikelet, the inflexed margins of the lower glume of the sessile spikelet, and the broad-based spicules on this glume.

A. depressus is probably more closely related to *A. castratus*; both have an upper glume with a narrow, 0.1–0.3 mm wide, membranous margin, lemmas with pilose

margins and a palea. *A. lanceolatus* has broad, 0.2–0.8 mm wide, membranous margins, glabrous lemmas and no palea.

A. depressus differs from *A. castratus* by spikelets with a more cuneate than rectangular base, by less chitinous, more chartaceous glumes, and by a smooth lower glume (*A. castratus* has a spiculate glume).

3. *Arthraxon hispidus* (Thunb.) Makino

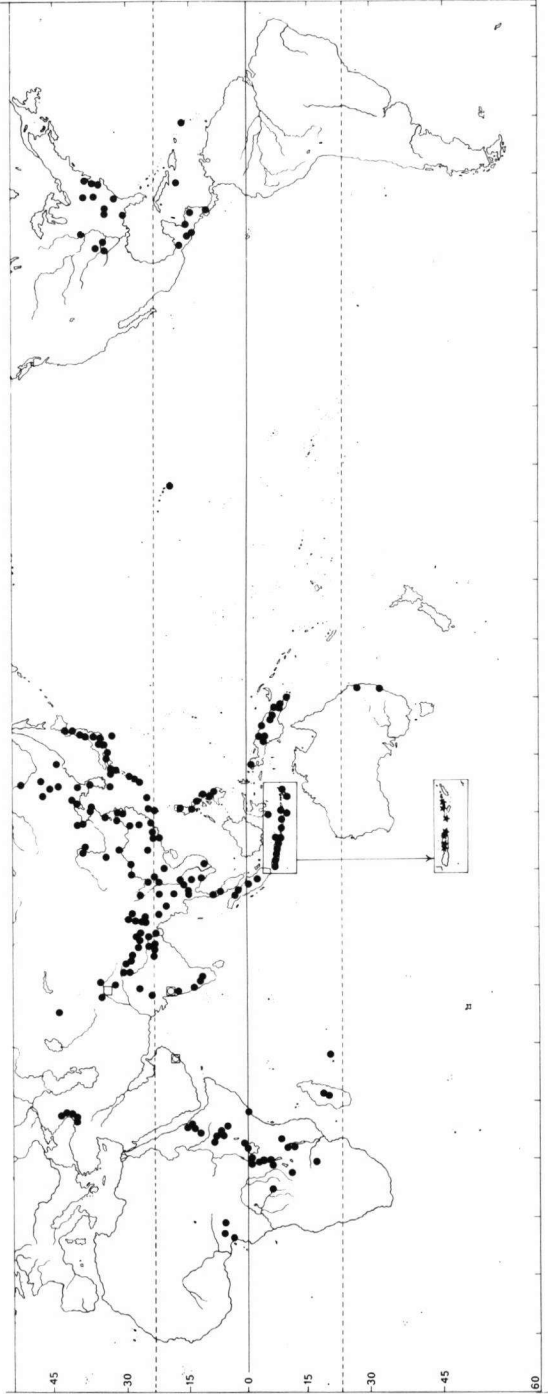
For literature see under the varieties.

Annual herb, slender to robust. *Culms* up to 65 (–200) cm high, glabrous; nodes pubescent. *Sheaths* glabrous but for the margin to hairy all over with short to long, patent, (often deciduous), bulbous-based hairs, which often increase in size and number distally. *Ligule* 0.4–3.5 mm high, margin usually pilose (hairs up to 1.7 mm long), sometimes glabrous. *Blades* 0.6–19.5 by 0.2–2.2 cm; margin in lower 0.3–0.8th part (to all over) with bulbous-based hairs, upwards ciliate; upper surface \pm smooth, glabrous to glabrescent to pubescent in the throat to pubescent all over with appressed to patent, short to long, bulbous-based hairs; lower surface usually less pubescent, smooth. *Peduncle* 1.5–30.5 cm long, 0.15–1.3 mm \varnothing , glabrous, sometimes upwards becoming appressedly white pubescent. *Inflorescence* 0.4–11.8 by 0.2–6 cm, with 1–30 branches, with 1–many spikelets, longest lowest branch 0.3–11.2 cm long; joints 0.6–7.3 mm long, glabrous to densely long pubescent all over, especially near their bases, joints of the upper spikelets usually more densely pubescent. Only *sessile spikelets* present, 1–8.4 by 0.3–1.8 mm; callus glabrous or with up to 1.2 mm long hairs. *Glumes* equal to unequal, chartaceous, except for the margins of the upper glume; lower glume rounded on the back, 0.9–7.7 by 0.2–1.4 mm, margins not inflexed, flat, 4–15-nerved, nerves over their whole length to at least in the upper 0.25th part with acute to aristate spicules, which increase distally to 0.3 mm long, sometimes between the nerves also with rows of minute spicules, otherwise smooth; upper glume 0.9–8.3 by 0.3–1.4 mm, inconspicuously 3–5-nerved, margin 0.1–1 mm wide, sometimes with patent to retrorse hairs. *Lemmas* with glabrous margins; lower lemma 1.1–5.8 by 0.1–0.8 mm, sometimes absent, not distinctly nerved; upper lemma 0.5–5.8 by 0.1–0.8 mm, distinctly 1-nerved, awn subbasal (to \pm halfway), sometimes enclosed by the glumes or absent; column with 0–16 coils, 0–8.9 mm long, smooth; arista 0–11.9 mm long. *Palea* absent. *Lodicules* 0.1–0.7 by 0.1–0.7 mm. *Anthers* 2 (or 3), 0.2–3.5 by 0.1–0.8 mm. *Styles* 0.5–3 mm long, stigmas 0.3–2.3 mm long. *Caryopsis* 0.8–3.4 by 0.2–0.6 mm. *Pedicelled spikelet* usually reduced to a 0.1–3.9 mm long glabrous to pilose stipe (sometimes absent), rarely with a vestigial glume up to 2.5 by 0.4 mm, 3–6-nerved (once with a well-developed spikelet, see var. *hispidus* note 8 and 13).

a. var. *hispidus*. — Fig. 1, 4, 17, 18; Map 2.

Arthraxon hispidus (Thunb.) Makino, Bot. Mag. Tokyo 26 (July 1912) 214; Merr., Philip. J. Sc. 7 (30 Sep 1912) 229, *pro comb. nov.*; Enum. Philip. Fl. Pl. I (1923) 41; Back. & van Slooten, Theconkr. (1924) 19,

Map 2: Distribution of: ● = *A. hispidus* (Thunb.) Makino var. *hispidus* (taxon 3a); ○ = var. *junnarensis* (Jain & Hemadri) Welzen (taxon 3b); ★ = var. *robustior* Welzen (taxon 3c) and □ = var. *santapaui* (Bor) Welzen (taxon 3d).



- pl. 38; Tanaka, Bull. Sc. Fakul. Terk. Kjušu Imp. Univ. 1 (1925) 194, *pro comb. nov.*; Back., Onkr. Suikerr. (1928) 51, pl. 45; Handb. Fl. Java 2 (1928) 75; Koidz., Fl. Symb. Or.-As. (1930) 70; Honda, J. Fac. Sc. Imp. Univ. Tokyo III, Bot. 3, 1 (1930) 326 (*incl. var. typicus, nom. inval.*); Hitchc., Brittonia 2 (1937) 128; Ohwi, Acta Phytotax. & Geobot. 11 (1942) 163; Hitchc. & Chase, Man. Grass. U.S., ed. 2 (1950) 748, 824; Back. in Heyne, Nutt. Pl., ed. 3, 1 (1950) 178; Bor, Grasses (1960) 99; Vickery, Contr. N.S.W. Nat. Hb., Fl. Ser. 19, 1 (1961) 29; Tzvel., Not. Syst. 22 (1963) 53, 55; Ohwi, Fl. Japan (1965) 192; Burbidge, Austr. Grass. 3 (1970) 196, pl. 83; Cufodontis, Bull. Jard. Bot. Nat. Belg. 40 (1970) 1387; Kiger, Rhodora 73 (1971) 39; Hsu, Taiwania 16 (1971) 306; Jain, J. Ind. Bot. Soc. 51 (1972) 173; Anon., Icon. Corm. Sin. 5 (1974) pl. 7225; Tanaka, J. Jap. Bot. 50 (1975) 30, pl. 3—x; Walker, Fl. Okinawa (1976) 237; Hsu, Fl. Taiwan 5 (1978) 618, pl. 1454; Simon, Tech. Bull. Bot. Br. Dep. Prim. Bot. Brisb. 4 (1980) 26. — *Phalaris hispida* Thunb., Fl. Jap. (1784) 44. — [*Chilochloa hispida* Beauv., Agrost. (1812) 158, *nom.*, cf. also Steud., Flora 29 (1846) 18 (*in synon.*)]. — *Digitaria hispida* Spreng., Syst. Veg. 1 (1825) 271. — *Lasiolytrum hispidum* Steud., Flora 29 (1846) 18; Syn. 1 (1853) 12 ('hirtum'). — *A. hispidus* Makino forma *hispidus*: Ohwi, Acta Phytotax. & Geobot. 11 (1942) 164. — *A. hispidus* Makino var. *hispidus*: Masamune, Sc. Rep. Kanazawa Univ. 4 (1956) 218. — T y p e: *Thunberg Hb. no. 1776* sub '*Phalaris, Leersia*' (UPS, n.v.; IDC 1036) Japan, see also no. 1995 sub '*Leersia*'.
- A. ciliaris* Beauv., Agrost. (1812) 111, 152, t. 11, f. 6 ('*ciliare*'); Hance, J. Linn. Soc. Bot. 13 (1873) 134; Benth., Fl. Austr. 7 (1878) 524; Franch. & Sav., Enum. Pl. Jap. 2 (1879) 187; F.-Vill. in Blanco, Fl. Filip. ed. 3, 4 Nov. App. (1882) 315; Hack., Mon. Androp. (1889) 354; Dur. & Sch., Consp. Fl. Afr. 5 (1895) 703; Hook. f., Fl. Br. Ind. 7 (1897) 145; Matsamune & Hayata, J. Coll. Sc. Imp. Univ. Tokyo 22 (1906) 523; Henr., Blumea 4 (1941) 524; Henty, Bot. Bull., Lae 1 (1969) 30, pl. 4, 32; Monod de F. in Back. & Bakh. f., Fl. Java 3 (1969) 605 (*incl. ssp. ciliaris*); Steen., Bot. J. Linn. Soc. 79 (1979) 115. — *Polinia ciliaris* Spreng., Syst. Veg. 1 (1825) 289. — *A. ciliaris* Beauv. var. *genuinus* Hack., Mon. Androp. (1889) 355, *nom. inval.*; Bull. Hb. Boiss. 7 (1899) 642; Matsum., Ind. Pl. Jap. 2 (1905) 39; Nakai, Bot. Mag. Tokyo 26 (1912) 9; Matsuda, Bot. Mag. Tokyo 28 (1914) 318; Camus, Fl. Gén. I.-C. 7 (1922) 300. — *A. cryptatherus* Koidz. var. *ciliaris* Koidz., Bot. Mag. Tokyo 39 (1925) 301, *comb. ill.* — *A. hispidus* Makino var. *ciliaris* Koidz., Fl. Symb. Or.-As. (1930) 71; Honda ex Nakai, Veg. Apoi (1930) 73, *pro comb. nov.?* (n.v.); Honda, J. Fac. Sc. Imp. Univ. Tokyo III, Bot. 3, 1 (1930) 328; Makino, Ill. Fl. Japan (1954) 831. — *A. hispidus* Makino var. *ciliaris* Masamune & Yanagihara, Trans. Nat. Hist. Soc. Formosa 31 (1941) 326 (n.v.). — T y p e: *Richard s.n.* (P) 'cultivé par son oncle à Trianon'. See note 3a.
- Pleuroplitis langsdorffii* Trin., Fund. Agrost. (1820) 175; Regel, Bull. Ac. St. Petersb. 10 (1866) 371 (*incl. var. typica*, l.c. 373, 374, *nom. inval.*). — *Deyeuxia japonica* Spreng., Syst. Veg. 1 (1825) 245, *nom. superfl.* — *Andropogon amplexifolius* Trin., Mém. Ac. St. Petersb. VI, Math. Phys. Nat. 2 (1832) 274, *nom. superfl.* — *Lucaea langsdorffii* Steud., Syn. 1 (1854) 413 ('*langsdorfiana*'). — *A. langsdorffii* Hochst., Flora 39 (1856) 188 ('*langsdorfiana*'); Kom., Fl. U.S.S.R. 2 (1934) 13 (*incl. var. genuinus, nom. inval.*); Tzvel., Not. Syst. U.R.S.S. 22 (1963) 54. — *A. ciliaris* Beauv. ssp. *langsdorffii* Hack., Mon. Androp. (1889) 354; Pilg. in Perk., Fragm. Fl. Philip. (1904) 139; Hack., Philip. J. Sc. 1, Suppl. (1906) 265; Merr., Philip. J. Sc. 1, Suppl. (1906) 333; Matsamune & Hayata, J. Coll. Sc. Imp. Univ. Tokyo 22 (1906) 523; Hayata, Ic. Pl. Form. 7 (1918) 79. — *A. hispidus* Makino forma *langsdorffii* Back., Handb. Fl. Java 2 (1928) 75, status here appointed. — T y p e: *Langsdorff s.n.* (LE, n.v.; i s o in BM) Japan, e Nagasaki. See note 9.
- Lucaea gracilis* Kunth, Rév. Gram. 2 (1831) 489, pl. 159, n.v.; Enum. Pl. 1 (1833) 472; Suppl. (1835) 382. — *A. gracilis* Hochst., Flora 39 (1856) 188. — *Pleuroplitis langsdorffii* Trin. var. *gracilis* Regel, Bull. Ac. St. Petersb. 10 (1866) 373. — *A. ciliaris* Beauv. var. *gracilis* Hack., Mon. Androp. (1889) 355. — T y p e: (P, n.v.; i s o in K, n.v.) Culta in Horto Kewensi (*ex descr.*).
- Pleuroplitis plumbea* Nees [ex Wight, Cat. (1834) 98, *nom.*] ex Arn. in Nees, Edinb. New Phil. J. 18 (1835) 181; Miq., Fl. Ind. Bat. 3 (1857) 481. — *Lucaea plumbea* Nees ex Steud., Syn. 1 (1854) 414. — *A. plumbeus* Hochst., Flora 39 (1856) 189; C. B. Clarke, J. Linn. Soc. Bot. 25 (1889) 86 ('*plumbeum*'). — *Pleuroplitis quartiniana* Regel var. *plumbea* Regel, Bull. Ac. St. Petersb. 10 (1866) 377. — T y p e: *Wight KD 1683* (P, n.v.; i s o in K, U) India orientalis.
- Batratherum micans* Nees, Edinb. New Phil. J. 18 (1835) 182. — *Andropogon micans* Steud., Syn. 1 (1854) 382. — *A. micans* Hochst., Flora 39 (1856) 188; Franch., Nouv. Arch. Mus. Hist. Nat. Paris II, 10 (1887) 109, *pro comb. nov.* (n.v.); Pl. David. 2 (1888) 147; Bor, Grasses (1960) 101; Gill., Rev. Fl. Mal., 3 Gram. (1971) 288; Mehra & Sharma, Taxon 21 (1972) 340; Jain, J. Ind. Bot. Soc. 51 (1972) 178, pl. 11. — *A. cuspidatus* Hochst. var. *micans* Hack., Mon. Androp. (1889) 353, *comb. ill.*; Pilg., Bot. Jahrb. 29 (1900) 222; Dur. & Sch., Consp. Fl. Afr. 5 (1895) 703. — S y n t y p e s: *Royle 217* (B, CGE, LE, Merseyside County Mus. Hb., n.v.; K. neg. 18608); *Royle 218* (K, K. neg. 18608; B, CGE, LE, Merseyside County Mus. Hb., n.v.) India, Benghala boreali. See note 3c.
- [*Psilopogon schimperi* Hochst., Flora 29 (1846) 117, *nom.*, in *synon.* sub *Batratherum schimperi* (cf. A.

- lancifolius*]). — T y p e: *Schimper 96* (TUB?, n.v.) Abyssinia. See also note on *Ps. capensis* (nom. excl.).
- Alectoridia quartiniana* A. Rich., Tent. Fl. Abyss. 2 (1851) 448, pl. 99. — *Andropogon alectoridia* A. Rich. ex Steud., Syn. 1 (1854) 383, non *Andropogon quartinianus* A. Rich. (1851). — *A. schimperii* Hochst., Flora 39 (1856) 189, nom. superfl. — *Pleuroplitis quartiniana* Regel, Bull. Ac. St. Petersb. 10 (1866) 377, t. 10, pl. 15, 16 (incl. var. *typica*, nom. inval.). — *A. ciliaris* Beauv. ssp. *quartinianus* Hack., Mon. Androp. (1889) 356; Philip. J. Sc. 1, Suppl. (1906) 266; Merr., Philip. J. Sc. 1, Suppl. (1906) 333. — *A. ciliaris* Beauv. var. *quartinianus* Hack., Mon. Androp. (1889) 356; Dur. & Sch., Consp. Fl. Afr. 5 (1895) 703; Camus, Fl. Gén. I.-C. 7 (1922) 300. — *A. quartinianus* Nash, N. Am. Fl. 17 (18 Sep 1912) 99; Merr., Philip. J. Sc. 7 (Sep 1912) 229, *pro comb. nov.*; Fl. Manilla (31 Dec 1912) 77; Stapf, Fl. Trop. Afr. 9 (1917) 166; Merr., Enum. Philip. Fl. Pl. 1 (1923) 42; Henr., Blumea 4 (1941) 525; Jansen, Reinwardtia 2 (1953) 23; Bharucha & Satyanarayan, Vegetatio (1954) 131; Bor, Grasses (1960) 102; Metcalfe, Anot. Mon. 1 (1960) 43; Gould & Soderstrom, Can. J. Bot. 48 (1970) 1635; Banerjee & Pal, Bull. Bot. Surv. India 12 (1970) 70; Pohl & Davidse, Brittonia 23 (1971) 304; Jain, J. Ind. Bot. Soc. 51 (1972) 179; Sindhe *e.a.*, Taxon 24 (1975) 367; Steen., Bot. J. Linn. Soc. 79 (1979) 115; Dujardin, Taxon 28 (1979) 275. — *A. hispidus* Makino forma *quartinianus* Back., Handb. Fl. Java 2 (1928) 75, *sine statu*; Jansen, Reinwardtia 2 (1953) 231. — *A. quartinianus* Nash ssp. *quartinianus*: Monod de F. in Back. & Bakh. f., Fl. Java 3 (1969) 606. — *A. quartinianus* Nash var. *quartinianus*: Jain, J. Ind. Bot. Soc. 51 (1972) 180, pl. 13. — T y p e: *Dillon s.n.* (P, n.v.; i s o in L, W) Abyssinia, Adoua, ad marginem stagnorum. See note 3c and 7.
- Andropogon cuspidatus* Hochst. ex A. Rich., Tent. Fl. Abyss. 2 (1851) 456; Steud., Syn. 1 (1854) 383. — *Batratherum cuspidatum* Hochst., Flora 39 (1856) 178. — *A. cuspidatus* Hochst., Flora 39 (1856) 188; Hack., Mon. Androp. (1889) 353 (incl. var. *genuinus*, nom. inval.); Dur. & Sch., Consp. Fl. Afr. 5 (1895) 703. — T y p e: *Schimper 1438* (P, n.v.; i s o in A, BM, L, W) Abyssinia, Dscheladscheranne. See note 3a.
- Pleuroplitis centrasiatica* Griseb. in Ledeb., Fl. Ross. 4 (1853) 477. — *Pleuroplitis langsdorffii* Trin. var. *centrasiatica* Regel, Bull. Ac. St. Petersb. 10 (1866) 374. — *A. ciliaris* Beauv. var. *centrasiaticus* Hack., Mon. Androp. (1889) 355; Matsum., Ind. Pl. Jap. 2 (1905) 40. — *A. hispidus* Makino var. *centrasiaticus* Honda, Bot. Mag. Tokyo 39 (1925) 278; J. Fac. Sc. Imp. Univ. Tokyo III, Bot. 3, 1 (1920) 327; Ohwi, Acta Phytotax. & Geobot. 11 (1942) 164. — *A. cryptatherus* Koidz. var. *centrasiaticus* Koidz., Bot. Mag. Tokyo 39 (1925) 301, *comb. ill.* — *A. langsdorffii* Hochst. var. *centrasiaticus* Kom., Fl. U.S.S.R. 2 (1934) 13. — *A. hispidus* Makino forma *centrasiaticus* Ohwi, Acta Phytotax. & Geobot. 11 (1942) 164. — *A. centrasiaticus* Gamajun, Opr. Zlak. Kazakst. (1948) 10 (n.v.); Pavlov, Fl. Kazakhst. 1 (1950) 123; Tzvel., Not. Syst. 22 (1963) 54. — *A. hispidus* Makino ssp. *centrasiaticus* Tzvel., Nov. Syst. Pl. Vasc. 14 (1977) 233; Probatova, Nov. Syst. Pl. Vasc. 17 (1979) 78. — T y p e: *Schrenk s.n.* (LE, n.v.; i s o in K, W) Siberia in deserto songorico ad lacum Alakul. See note 9.
- Andropogon lasiocoleus* Steud. [in Zoll., Syst. Verz. 1 (1854) 59, nom. ('*lasiocladus*')], Syn. 1 (1854) 383 ('*lasiokoleos*' p. 437). — *A. lasiocoleus* Hochst., Flora 39 (1856) 189. — L e c t o t y p e: *Zollinger 42* (P, here proposed; i s o in BM in Hb. Shuttleworth) Japan, non Java, fide Zoll. (1854).
- Andropogon submuticus* Nees ex Steud., Syn. 1 (1854) 382. — *A. submuticus* Hochst., Flora 39 (1856) 188; Hook. f., Fl. Br. Ind. 7 (1897) 144; Jain, J. Ind. Bot. Soc. 51 (1972) 181, pl. 10. — *Batratherum submuticum* Nees ex W. Watson in Atk., Gaz. N.W. Prov. Ind. 10 (1882) 392 ('*submuticus*'), 638 ('*Batrarotherum*'). — *A. ciliaris* Beauv. ssp. *submuticus* Hack., Mon. Androp. (1889) 356; Rendle, J. Linn. Soc. Bot. 36 (1904) 360; Matsum., Ind. Pl. Jap. 2 (1905) 40. — *A. cryptatherus* Koidz. ssp. *submuticus* Koidz., Bot. Mag. Tokyo 39 (1925) 301, *comb. ill.* — T y p e: *Wallich 8836* (BM, K, W; CAL, n.v.; IDC 7394) Nepal. See note 6.
- Andropogon nudus* Nees ex Steud., Syn. 1 (July 1854) 383. — *A. nudus* Hochst., Flora 39 (1856) 188; Benth. ex C. B. Clarke, J. Linn. Soc. Bot. 25 (1889) 86, *pro spec. nov.*; Bor, Grasses (1960) 101; Fl. Iran. 70 (1970) 534; Gill., Rev. Fl. Mal., 3 Gram. (1971) 287; Jain, J. Ind. Bot. Soc. 51 (1972) 178, pl. 15; Mehra & Kalia, Taxon 24 (1975) 511. — *A. ciliaris* Beauv. ssp. *nudus* Hack., Mon. Androp. (1889) 356; Bull. Hb. Boiss. II, 4 (1904) 527; Matsum., Ind. Pl. Jap. 2 (1905) 40; Hack., Philip. J. Sc. 1, Suppl. (1906) 266; Merr., Philip. J. Sc. 1, Suppl. (1906) 333; Matsumura & Hayata, J. Coll. Sc. Imp. Univ. Tokyo 22 (1906) 523. — *A. cryptatherus* Koidz. ssp. *nudus* Koidz., Bot. Mag. Tokyo 39 (1925) 301, *comb. ill.* — *A. hispidus* Makino var. *nudus* Ohwi, Bull. Tokyo Sc. Mus. 18 (1947) 1. — S y n t y p e s: *Wallich 8834 A* (K, P, n.v.); *Wallich 8835 A* (BM, C, K, W; CAL, P, n.v.); *Wallich 8835 B* (K, P, n.v.) India, Tavoy, IDC 7394. See note 2.
- Lucaea vriesii* Buse in Miq., Pl. Jungh. (Aug 1854) 366. — *A. ciliaris* Beauv. ssp. *vriesii* Hack., Mon. Androp. (1889) 358. — *A. hispidus* Makino forma *vriesii* Back., Handb. Fl. Java 2 (1928) 75, status here appointed. — *A. quartinianus* Nash ssp. *vriesii* Henr., Blumea 4 (1941) 525; Monod de F. in Back. & Bakh. f., Fl. Java 3 (1969) 606. — *A. hispidus* Makino var. *vriesii* Ohwi, Bull. Tokyo Sc. Mus. 18 (1947) 1. — S y n t y p e s: *Junghuhn s.n.* (L, no. 903.342-359-362, 908.84-76) Java, Tjibogo. See note 3b.

- Lucaea major* Hochst. ex Steud., Syn. 1 (Nov 1854) 414. — *A. major* Hochst., Flora 39 (1856) 188. — *Pleuroplitis major* Regel, Bull. Ac. St. Petersb. 10 (1866) 370, t. 10, f. 13, 14, non Miq. (1857). — T y p e: Schimper 1829 (P, n.v.; i s o in A) Abyssinia.
- Lucaea violacea* Steud., Syn. 1 (Nov 1854) 414. — *A. violaceus* Hochst., Flora 39 (1856) 189; Benth. ex C. B. Clarke, J. Linn. Soc. Bot. 25 (1889) 86, pro comb. nov. — T y p e: Wallich 8833 A (P, n.v.; i s o in K; CAL, n.v.; IDC 7394) Nepal.
- A. coloratus* Hochst., Flora 39 (1856) 188. — *Pleuroplitis quartiniana* Regel var. *tenella* Regel, Bull. Ac. St. Petersb. 10 (1866) 377. — *A. ciliaris* Beauv. var. *coloratus* Hack., Mon. Androp. (1889) 357, nom. superfl.; Dur. & Sch., Consp. Fl. Afr. 5 (1895) 703. — T y p e: Schimper 1532 (TUB?, n.v.; i s o in L, P, W) Abyssinia. See note 10.
- A. japonicus* Miq., Ann. Mus. Bot. Lugd. Bat. 2 (1866) 288 ('japonicum'); Prol. Fl. Jap. (1867) 176 ('japonicum'). — S y n t y p e s: *Burger s.n.* (L, no. 908.84–29); *Pierot s.n.* (L, no. 908.84–56); *Siebold s.n.* (L, no. 908.84–79); *Textor s.n.* (L, no. 908.84–79) Japan.
- Pleuroplitis langsdorffii* Trin. var. *brevisetata* Regel, Bull. Ac. St. Petersb. 10 (1866) 374, t. 10, f. 6–10. — *A. hispidus* Makino var. *brevisetatus* Hara, Bot. Mag. Tokyo 52 (1937) 186. — *A. hispidus* Makino forma *brevisetatus* Ohwi, Acta Phytotax. & Geobot. 11 (1942) 164. — T y p e: Maximowicz s.n. (LE) Japan, Hakodate.
- Pleuroplitis langsdorffii* Trin. var. *caucasica* Rupr. ex Regel, Bull. Ac. St. Petersb. 10 (1866) 373. — *Pleuroplitis caucasica* Rupr. ex Trautv., Acta Hort. Petrop. 9, 1 (1884) 361. — *A. caucasicus* Tzvel., Not. Syst. U.R.S.S. 22 (1963) 55. — T y p e: Ruprecht s.n. (LE, n.v.) Prov. Caucasus inter Quareli et Sazchenis in graminosis (ex descr.). See note 9.
- Pleuroplitis langsdorffii* Trin. var. *chinesis* Regel, Bull. Ac. St. Petersb. 10 (1866) 375. — T y p e: Hance s.n. (LE, n.v.) China, prope Whampoa (ex descr.).
- Pleuroplitis langsdorffii* Trin. var. *japonica* Regel, Bull. Ac. St. Petersb. 10 (1866) 373. — *A. hispidus* Makino var. *japonicus* Hack. ex Mori, Enum. Pl. Corea (1922) 38. — *A. hispidus* Makino forma *japonicus* Ohwi, Acta Phytotax. & Geobot. 11 (1942) 164. — T y p e: Maximowicz s.n. (LE; i s o in K, L, W) Japan, prope Hakodate.
- Pleuroplitis langsdorffii* Trin. var. *submutica* Regel, Bull. Ac. St. Petersb. 10 (1866) 373, t. 10, f. 5. — *A. ciliaris* Beauv. var. *cryptatherus* Hack., Mon. Androp. (1889) 355, nom. nov., non var. *submuticus* Hack., 1889; Makino, Bot. Mag. Tokyo 10 (1896) 66; Hack., Bull. Hb. Boiss. 7 (1899) 642; Matsum., Ind. Pl. Jap. 2 (1905) 39; Hitchc. & Chase, Man. Grasses U.S., ed. 2 (1950) 748, f. 1138 + map. 824. — *A. hispidus* Makino var. *cryptatherus* Honda, Bot. Mag. Tokyo 39 (1925) 277, nom. superfl.; Hitchc., U.S. Dep. Agric., Bull. 772 (1936) 277; Walker, Fl. Okinawa (1976) 237. — *A. cryptatherus* Koidz., Bot. Mag. Tokyo 39 (1925) 301, nom. superfl. — *A. langsdorffii* Hochst. var. *cryptatherus* Kom., Fl. U.S.S.R. 2 (1934) 13, nom. superfl. — *A. langsdorffii* Hochst. var. *submuticus* Grossh., Trudy Bot. Inst. Azerb. Akad. Nauk S.S.S.R. 8 (1939) 117, n.v. — S y n t y p e s: Maximowicz s.n. (A, BM, K, L, LE, W) Japonica, prope Hakodate; Maximowicz s.n. (W; LE, n.v.) Japonica, prope Jukohuma. See note 4.
- Pleuroplitis quartiniana* Regel var. *caespitosa* Regel, Bull. Ac. St. Petersb. 10 (1866) 377. — S y n t y p e s: Schmidt s.n. (LE, n.v.) India orientalis, Nilgherries; Schimper 1829 p.p. (LE, n.v.) Abyssinia, province Schire, in montibus Cojetanis (ex descr.).
- A. ciliaris* Beauv. var. *australis* Benth., Fl. Austr. 7 (1878) 524 ('ciliare var. australe'); Hack., Mon. Androp. (1889) 355; Metcalfe, Anato. Mon. 1 (1960) 43. — T y p e: C. Stuart s.n. (K; i s o in BM) Australia, New South Wales, New England.
- A. ciliaris* Beauv. var. *tenellus* Benth., Fl. Austr. 7 (1878) 524. — T y p e: Bailey s.n. (K?, n.v.) Australia, Queensland, Tawomba (ex descr.).
- [*Batratherum plumbeum* Duthie in Atk., Gaz. N.W. Prov. India 10 (1882) 638 ('Batrathotherum'), nom., non Nees (1835)]. — T y p e: Strachey & Winterbottom 2 (K?, n.v.) Himalaya (ex descr.).
- A. brevirstatus* Hack., Mon. Androp. (1889) 350; Hook. f., Fl. Br. Ind. 7 (1897) 144; Rendle, J. Linn. Soc. Bot. 36 (1904) 359; Bor, Fl. Assam 5 (1940) 376; Jain, J. Ind. Bot. Soc. 51 (1972) 165, pl. 1; Mehra & Kalia, Taxon 24 (1975) 511. — S y n t y p e s: Delavay 1811 (P, n.v.) China, Yunnan, prope Ki-mi-se, as rivulos montium; Hook. f. & T. Thomson s.n. (K, L, W) India orientalis in montium Khasia regio temporale inter 1300–2000 m. See note 6.
- A. ciliaris* Beauv. var. *glabrescens* Hack., Mon. Androp. (1889) 357. — *A. quartinianus* Nash var. *glabrescens* Jain, J. Ind. Bot. Soc. 51 (1972) 180, pl. 14. — S y n t y p e s: Hook. f. & T. Thomson s.n. (L, W; K, n.v.) Himalaya, Khasia; Wallich 8833 C (K, L, W, IDC 7394) Nepal. See note 7.
- A. ciliaris* Beauv. var. *hookeri* Hack., Mon. Androp. (1889) 357. — *A. hispidus* Makino var. *hookeri* Honda, J. Fac. Sc. Imp. Univ. Tokyo III, Bot. 3, 1 (1930) 329. — *A. hookeri* Henr., Blumea 4 (1941) 526; Bor, Grasses (1960) 99; Jain, J. Ind. Bot. Soc. 51 (1972) 174. — T y p e: Hook. f. & T. Thomson s.n. (W; i s o in A, L; K, n.v.) India, Sikkim, regio tropical. See note 8.
- A. inermis* Hook. f., Fl. Br. Ind. 7 (1897) 145; Bharucha & Satyanarayan, Vegetatio (1954) 132; Jain, J.

- Ind. Bot. Soc. 51 (1972) 174. — *A. inermis* Hook. f. var. *inermis*: Jain, J. Ind. Bot. Soc. 51 (1972) 174, pl. 5. — T y p e: *Woodrow 189* (K) India, Deccan. See note 6.
- Dimeria scrobiculata* C. B. Clarke ex Koord., Exk. Fl. Java 1 (1911) 102; Atlas 1 (1913) f. 35. — S y n t y p e s: C. B. Clarke 17481 B (BO, n.v.) India, Khasia, 1300 m; *Ottolander 358* (BO) Java, Jojen, Kajumas, 1000 m.
- A. pauciflorus* Honda, Bot. Mag. Tokyo 39 (1925) 276; J. Fac. Sc. Imp. Univ. Tokyo III, Bot. 3, 1 (1930) 329; Hsu, Fl. Taiwan 5 (1978) 620. — T y p e: *Sasaki 22* (TI) Formosa, insula Kotosho.
- A. pauciflorus* Honda var. *muticus* Honda, Bot. Mag. Tokyo 39 (1925) 277; J. Fac. Sc. Imp. Univ. Tokyo III, Bot. 3, 1 (1930) 329. — *A. hispidus* Makino var. *muticus* Ohwi, Acta Phytotax. & Geobot. 11 (1942) 173; Masamune, Sc. Rep. Kanazawa Univ. 4 (1956) 218. — T y p e: *Sasaki 28* (TI) Formosa, insula Kotosho.
- A. hispidus* Makino var. *microphyllus* Honda, Bot. Mag. Tokyo 45 (1931) 43. — T y p e: *Tsukamoto s.n.*, 1931 (TI) Japan, Hondo, province Suruga, Gotemba.
- A. kobuna* Honda, Bot. Mag. Tokyo 49 (1935) 697. — *A. hispidus* Makino forma *kobuna* Ohwi, Acta Phytotax. & Geobot. 11 (1942) 164. — T y p e: *Mayehara 349* (TI) Japan, Kyushu, Province Higo, Nishize.
- A. hispidus* Makino var. *hispidissimus* Honda, Bot. Mag. Tokyo 49 (1935) 698. — *A. hispidus* Makino forma *hispidissimus* Ohwi, Acta Phytotax. & Geobot. 11 (1942) 164. — T y p e: *Takahashi 42* (TI, n.v.) Japan, Kyushu, Province Higo, Kugino (*ex descr.*, I unfortunately did not ask for this specimen).
- A. mauritianus* Stapf ex Hub., Kew Bull. (1939) 653. — T y p e: *Ayres 47* (K) Mauritius, Mount Ponce, near the summit and at Chateau d'Eau. See note 5.
- A. pallidus* Henr., Blumea 4 (1941) 526; Reeder, J. Arn. Arb. 29 (1948) 380 (*spec. dub.*); Henty, Bot. Bull., Lae 1 (1969) 32. — T y p e: *Clemens s.n.*, 20 Nov 1935 (L) New Guinea, Morobe district, Sattelberg, hills about mission houses, 3000 ft. See note 11.
- A. hispidus* Makino forma *macranthus* Ohwi, Acta Phytotax. & Geobot. 11 (1942) 164 (*pro var. in clave*). — T y p e: *Hatusima 3* (KYO) Japan, Kyushu, Chikuza, Ainosshima. See note 1.
- A. hispidus* Makino forma *formosanus* Ohwi, Acta Phytotax. & Geobot. 11 (1942) 164. — T y p e: *Faurie 87 b* (TI, n.v.; i s o in BM, KYO) Formosa, Tamsui.
- A. hispidus* Makino forma *riukiensis* Ohwi, Acta Phytotax. & Geobot. 11 (1942) 164. — T y p e: *Takamine 675* (KYO) Ryukyu islands, Miyako, Taruamjuna.
- A. okamotoi* Ohwi, Acta Phytotax. & Geobot. 11 (1942) 165. — T y p e: *Okamoto s.n.* (KYO) Formosa, Kaohsiung, Chishan. See note 13a.
- A. hispidus* Makino var. *monticola* Hiyama, J. Jap. Bot. 22 (1948) 56. — *A. hispidus* Makino forma *monticola* Hiyama, J. Jap. Bot. 33 (1958) 192. — T y p e: *Hiyama s.n.* (MAK?, n.v.) Japan, Hondo, Kodyuke (*ex descr.*; this species if indeed in MAK was presently unavailable, Prof. Kasaki in litt.).
- A. antsirabensis* A. Camus, Bull. Soc. Bot. Fr. 95 (1948) 149; Bosser, Gram. Madagascar (1969) 231, pl. 212. — S y n t y p e s: *Perrier de la Bâthie 11155* (P) Madagascar, Antsirabe, 1500 m, haies, fossés; *Catât 370* (P) Madagascar, Andraraty; *Hb. Jardin Tananarive* (P) Itasy. See note 5.
- A. quartinianus* Nash var. *monostachyus* Jansen, Reinwardtia 2 (1953) 231. — T y p e: *Elbert 1194* (L) Lesser Sunda Islands, Lombok, Rindjani Vulcano, North side, Putihdal, Barranco of Rindjani-caldeira, 2000–2400 m. See note 12.
- A. nitidulus* Stapf ex Bor, Grasses (1960) 101, 688; Jain, J. Ind. Bot. Soc. 51 (1972) 178, pl. 4. — T y p e: *Ritchie 796 a* (K) India, Belgaum. See note 6.
- [*A. quartinianus* Nash var. *montanus* Jac.-Fél., Gram. Afr. Trop. 1 (1962) 292, pl. 229, *nom.*] — T y p e: *Jacques-Félix 2775* (P) Cameroon, Mount Bamboutos, 2000 m.
- A. satarensis* Almeida, J. Bombay Nat. Hist. Soc. 66 (1969) 515; *emend.* Deshpande & Hemadri, Bull. Bot. Surv. Ind. 12 (1970) 274; Jain, J. Ind. Bot. Soc. 51 (1972) 181. — T y p e: *McCann* or *Anonymous 8* (BLAT, n.v.; i s o in K) India, Satara, Keshyaturda. See note 7.
- Andropogon lanceolatus* auct. non Roxb.: Baker, Fl. Maur. & Seych. (1877) 444.
- Andropogon retzii* auct. non Steud.: Steud., Syn. 1 (1854) 375, *excl. syn.* Retz.
- Ischaemum ciliare* auct. non Retz.: Kunth, Enum. Pl. 1 (1833) 513; Steud., Nom. Bot., ed. 2, 1 (1840) 825.
- Pleuroplitis major* auct. non Miq.: Miq., Fl. Ind. Bat. 3 (1857) 481, *pro Wight KD 2589*. (See also var. *robustior* Welzen).

Herb, up to 45 (–100) cm high. *Leaf-blades* 0.8–7.4 by 0.2–0.8 cm, margin in lower 0.3 (–0.8)th with bulbous-based hairs. *Peduncle* 0.15–0.8 mm Ø. *Inflorescence* 0.4–8.1 by 0.2–5.3 cm. Joints 1.1–7.3 mm, about 0.55–0.9 times as long as the spikelet, glabrous to pilose to rarely long pilose all over. *Spikelets* ovate-lanceolate to ovate-linear-lanceolate, 1.9–7.9 by 0.4–1.5 mm. *Lower glume*

1.7–7.7 by 0.3–1.4 mm, dorsally smooth or with spicules along the nerves (sometimes also in between); upper glume 2.5–7.5 by 0.3–1.4 mm. *Lower lemma* always present. *Anthems* 2 or rarely 3. *Pedicelled spikelet* sometimes present as a vestigial lower glume up to 2.5 by 0.4 mm, 3–6-nerved, rarely well-developed (see also notes 8 and 13b).

Distribution: Central and East Africa; Madagascar; Mauritius; Caucasus; South-, South-East- and East Asia; Japan; Malesia (Borneo excepted); Central-East Australia. Introduced in Hawaii and Eastern North- and Central America.

Ecology: On open to shaded grasslands, woodclearings, waste areas. Often as a weed along rice-fields and in deserted plantations. Also found along sea-shores. On moist to dry, not very fertile soil. Usually scattered, but can be locally abundant. From sealevel up to 2850 m alt.

Vernacular names: Java: *jukut garingsing*, *kakawatang* (Sund.); *blabahan alit*, *roem terik* (Jav.); *përi-përijan* (Mad.). Lesser Sunda I.: *remang n-g'kor* (Flores, Manggerai). Philippines: *hanion* (Ifugoa); *timi-timi* (Bon.). New Guinea: *fyfyluwe* (Dani); *giri maning* (?); *gjag*, *mabaliok*, *peembina* (Enga); *den dunkiyp* (Wola); *era kalkari* (Hagen); *kandegrumbuk kandig*, *kandig kundul* (Togoba dialect, Hagan); *pingo* (?); *sûnswa* (Yoowi dialect, Hagen-Chimbu); *baganeh*, *nilbaganeh* (Masul dialect, Chimbu); *morimorisi*, *narunaha(h)* (Kefamo dialect, Asaro); *nanoroheh*, *sitripu* (Dunantina); *hangarnohoh* (Miruma); *kindjeba*, *kinzebakru*, *tuntewa*, *tuntewambang* (Minj dialect, Wahgi); *hitilifa* (Okapa); *humpyeya* (Tairora); *andurapata* (Manki); *tuandugu* (Daga). Japan: *kobuna-gusa*, *siro kobuna-gusa*.

Uses: According to Backer (1950) of little to no importance as a fodder, because of its low feeding value and low yield. Also used for rough thatching on temporary shelters (Papua New Guinea, Chimbu).

Collector's notes: Plant 15–100 cm high, pale-green. Blades midgreen, black-green. Culms maroon, reddish. Inflorescence greenish purple, brown. Joints purplish. Spikelets white, grey, green, green tinged purplish, red, reddish green, reddish purple, purple, mauve, yellow, yellowish green, brownish black. Awn purple. Stamens yellow. Stigmas violet, pale yellow. Fruit white.

Chromosome numbers: $n=5$ (Sindhe e.a., 1975, cf. *A. quartinianus*; curious count); $n=9$ (Mehra & Kalia, 1975, cf. *A. nudus* and *A. breviaristatus*); $n=18$ (Gould & Soderstrom, 1970, cf. *A. quartinianus*; Hsu, 1971, cf. *A. hispidus*; Pohl & Davidse, 1971, cf. *A. quartinianus*; Dujardin, 1979, cf. *A. quartinianus*).

Note: This species is most variable and has a wide distribution. It is therefore not surprising that many extremes have been described as separate taxa. As usual after a revision these turn out to be linked by all possible intermediates and none but three can be maintained. In habit for instance there is a gradual change: specimens from New Guinea have robust culms which sparingly branch mainly at base if at all and have large inflorescences with relatively few spikelets. The latter have well-developed, protruding awns. From New Guinea going northwards through Malesia, South-East Asia, India, and China to the Caucasus and from China through Japan to America, the plants gradually become more branched, more slender and smaller, while the inflorescences also diminish in size, but bear relatively

Fig. 1. *A. hispidus* var. *hispidus* (Chand 7969). — a. Habitus, $\times \frac{1}{2}$. — b. Spikelet, $\times 12$. — c. Upper glume, $\times 12$. — d. Upper lemma, $\times 12$. — e. Lower lemma, $\times 12$. — f. Lower glume, $\times 12$.

B. V. '80



more spikelets. The awn decreases in length, becomes even included by the glumes and in occasionally completely absent.

In the following notes some of the names most often encountered in literature are briefly discussed, as well as some curious collections. The sequence of the notes is determined by the diminishing acceptability of the names.

1) Ohwi (1942) described for Japan *forma macranthus*, with larger and more robust, longer-awned spikelets. Within Japan this form is apparently very distinct, because of these larger dimensions, but in regard to the total area of distribution, all measurements show overlap. Even in Japan, *Mayebari 349* (TI) has spikelets which look exactly like *var. macranthus* but are smaller and with a shorter awn (from a more northern region, what might explain the smaller dimensions; see preceding paragraph). This similarity may indicate that more Japanese material, than now was available, might supply the intermediate forms. It may be noted that this variety is deleted in the Flora of Japan by Ohwi (1965) himself.

Representative specimens: *Hatusima 3* (KYO) and *Nakasima 339* (KYO).

2) *A. nudus* is distinct from *A. hispidus* by longer, glabrous joints, about as long as the relatively more slender spikelets; together joint and spikelet have a linear-rectangular outline. The lower glume has few and small spicules in the uppermost part only, while *A. hispidus* has more densely spiculate glumes. Finally the spikelets of *A. nudus* disarticulate more easily, while the rachis may be more persistent. Anthers 2 or 3.

Some representative specimens: India: *Clarke 34131 A* (W) Singhboom; *40958 B* (W) Naga hills; *Hook f. & T. Thomson s.n.* (A, W) Khasia; *Wallich 8835 A* (BM, C, W) Tavoy. Sikkim: *Clarke 36587 A* (BM); *Kurz s.n.* (A). Thailand: *Kerr 2774* (BM); *9421* (BM). Sumatra: *Bünnemeijer 4326* (L). Malaya: *Corner s.n.* (BM, L). Java: *Kurz s.n.* (L). Philippines: *Merrill 102* (K) Luzon.

This form is quite distinct in India, where the 'typical' *A. hispidus* usually has hairy, relatively short joints and more densely spiculate glumes. But going from India towards Malesia the distinction becomes more and more troublesome and many intermediates are encountered. Here *A. hispidus* shows a tendency to more glabrous relatively longer joints and less-spiculate glumes. These many intermediate forms forced me to unite *A. hispidus* with *A. nudus*, although some formal recognition remains tempting.

3) *A. micans* (= *A. cuspidatus*) has always been separated from *A. hispidus* because of the pubescence of the joint. *A. micans* would have pilose joints and *A. hispidus* glabrous to subglabrous ones (Bor, 1960; Jain, 1972). The same character, together with the length of the stipe is also used to divide *A. ciliaris* (incl. *A. langsdorffii*) into species or infra-specific taxa (e.g. Hackel, 1889; Backer, 1928):

- a) *A. ciliaris s.s.*: joints glabrous or nearly so; stipe usually long. Representative specimens: Himalaya: *Heybroek 77* (L); Nepal: *Wallich 8833 C* (L, W); India: *Hook f. & T. Thomson s.n.* (A, W); Malaya: *Corner s.n.*, 2? Nov. 1941 (BM, K, L).
- b) *A. ciliaris ssp. vriesii*: joints pilose in the lower half; stipe usually long. Representative specimens: Tanzania: *Schlieben 1030* (B); Thailand: *Sørensen e.a. 592* (C); Java: *Bakh.f. 6429* (L), *Junghuhn s.n.* (L); Philippines: *Merrill 9656* (K, P).
- c) *A. micans* = *A. ciliaris ssp. quartinianus* or *A. quartinianus*: joints pilose all over or nearly so; stipe minute. Representative specimens: Zaire: *German 3596* (B); Tanzania: *Hitchcock 24662* (L); N. Vietnam: *Balansa 1739* (L); Java: *Buwalda 7390* (L).

In Africa all plants have the joints more or less completely pilose and belong to group c, but in India and especially in Malesia partly pilose (group b) and completely glabrous joints (group a) occur together with intermediate stadia. Moreover, in a number of specimens the rate of pubescence may range from glabrous to subglabrous at the base of the inflorescence (type a), through type b, to densely pubescent near the apex (type c), these plants are therefore impossible to place. Every length of the stipe occurs together with all kinds of pubescence and offers no clue either. Clayton (litt.) suggested to reduce *A. micans* to a subspecies of *A. hispidus* because of the intermediates, but in my opinion there are too many of them, and therefore *A. micans* can not be distinguished in any satisfactory way from *A. hispidus*.

4) Forms with small, usually included awns have been distinguished as var. *cryptatherus*. Actually, the type-specimens of *A. hispidus* and *A. ciliaris* have similar small awns. Such plants occur more often in the northern and southern, more temperate zones and there seems to be some correlation with latitude. The length of the awn and the proportion enclosed by the glumes changes only gradually, however, so that no taxonomic limit can be drawn. In the temperate areas, especially Japan, plants with exserted and hidden awns are apparently found together as collections occasionally are a mixture of both types.

Representative specimens: Nepal: *Norkett 5684* (BM); India: *Rao 20086* (L); Burma: *Kingdon-Ward 21412* (A); China: *Bonati 7014* (W); Vietnam: *Balansa 1740* (L); Corea: *Faurie 827* (W); Taiwan: *Faurie 705* (TI); Australia: *Imperial Institute s.n.*, 1926 (BM); Japan: *Thunberg s.n.* (BM), *Zollinger 42* (BM, P); USA: *Allard 11068* (A).

5) *A. antsirabensis* has been described from Madagascar and *A. mauritianus* from Mauritius. The first has robust, almost glabrous spikelets; the second has rather small sessile spikelets which are often accompanied by a pedicelled vestigial lower glume. On both islands collections are very homogeneous and show little variation, a common feature of island populations, which probably accounts for their separation from *A. hispidus*. Outside these islands the 'antsirabensis'-form is especially found in Papua New Guinea (no doubt of polytopic origin, but morphologically inseparable). The 'mauritianus'-form is found here and there within the rest of the area of distribution.

Representative specimens from outside these islands are:

A. antsirabensis: Nepal: *Nishioka 905* (KYO); India: *Clarke 24837 B* (W); Japan: *Mayebar 349* (TI); Philippines: *Loher s.n.* (K); Lesser Sunda I.: *Monod de Froideville 1756* (L); New Guinea: *McKee 1314* (L).

A. mauritianus: Ethiopia: *Schimper 1438* (A, BM, L, W); India: *Anonymous 399* (A).

6) Several species, i.e. *A. breviaristatus*, *A. inermis*, *A. nitidulus* and *A. submuticus* have been based on plants with 3 anthers per flower ('true *A. hispidus*' having 2). *A. breviaristatus* looks like the 'real' *A. hispidus*, but with a somewhat shorter awn; *A. nitidulus* looks like the former, but has more plump spikelets; *A. submuticus* has no awn and *A. inermis* has relatively small spikelets [2.5 – 3 (– 3.5) mm, cf. var. *tzvelevii* (*nomina dubia*)]. Of all these forms I have only seen one or two specimens which could be attributed to these 'species'; this is partly due to the fact that the anthers are usually absent, as they are soon deciduous after ejection at anthesis.

If the presence of three anthers is considered as an exceptional, but possible feature of *A. hispidus* (like Jain, 1972, in his concept of *A. quartinianus* and *A. nudus*),

then there is no other way to separate the species mentioned above from *A. hispidus* on any taxonomic level. Short or absent awns are northern and southern forms (see note 4), *A. nitidulus* is otherwise identical with 'normal' *A. hispidus*, and the small spikelets of *A. inermis* are found among many 2-anthered specimens from Ethiopia, India, and Japan.

Representative specimens:

A. breviaristatus: China: Delavay 1811 (P); India: Hook. f. & T. Thomson s.n. (K, L, W).

A. inermis: India: Woodrow 189 (K).

A. nitidulus: India: Ritchie 796 A (K).

A. submuticus: Nepal: Wallich 8836 (BM, K, W).

7) Jain (1972) separated *A. satarensis* Almeida from *A. quartinianus* var. *glabrescens* in his key by spikelets 5.5–6.25 mm long, pedicel (= stipe) present or absent; versus spikelets c. 4.5 mm long, pedicels present. Unfortunately he based himself on an incorrectly emended description by Deshpande & Hemadri (1970), based on specimens collected by themselves. These specimens are slightly different from Almeida's type. Thus, when using Jain's key, Almeida's type-specimen actually keys out to *A. quartinianus* var. *glabrescens*! When the Indian material is arranged according to the length of the spikelets no disjunctions can be shown; length may therefore not be used in the delimitation of taxa. The absence or presence of the stipe is equally too variable to be of any taxonomic use here or elsewhere in *Arthraxon*. For the same reasons Jain's distinction of *A. quartinianus* var. *quartinianus* (spikelets c. 3 mm long; pedicels absent) cannot be accepted.

Representative specimens:

A. satarensis: India: Hemadri 106807 (K, L); McCann/Anonymous 8 (K)

A. quartinianus: see note 3c (*A. micans*).

8) *A. hookeri* has rather long glumes (5–6.5 mm), covered often by rows of aristate spicules on and between the nerves and *A. hookeri* has rather small anthers (see also Henrard, 1941). The first character is also typical for *A. satarensis* (see note 7), and cannot be used for any taxonomical distinction; the length of the anthers shows no disjunctions either and is also useless as a character for delimitation.

Jain (1972) reported that pedicelled spikelets are usually present. In the specimens I have studied, I have observed this a few times in plants which are typical *A. hispidus* (see also note 13a, b).

Representative specimens: Sikkim: Hook. f. & T. Thomson s.n. (A, L, W).

9) *A. centrasiaticus*, *A. caucasicus*, and *A. langsdorffii* are distinguished from each other by the pubescence of the leaf-blades: the first two are pubescent on both sides, the third is glabrous but for the setose to ciliate margin. In general it may be said that the indument is very variable in this species and cannot be relied upon as to distinguish taxa.

According to Tzvelev (1963), *A. centrasiaticus* differs from *A. caucasicus* by longer spicules on the glumes; it occurs at lower altitudes in Central Asia, while *A. caucasicus* is found at higher altitudes in the Caucasus, i.e. a disjunct area is present. The size of the spicules is again very variable within the complex and seems untrustworthy as a distinctive character. I can have no well-founded opinion on the difference between these two 'species'; but judging the collections it is impossible to apply the names without knowing the provenance. The attempt to distinguish *A.*

caucasicus from *A. centrasiaticus* seems therefore due to an overrated appraisal of disjunct areas in space and elevation. According to Probatova (1979) there is now a connecting railway between the Baykal and Amur area and *A. centrasiaticus* is found along it. It would be interesting to see what the result of an intermingling of the so-called species will be.

Representative specimens:

A. caucasicus: Turkey: *Balansa 1546* (L); U.S.S.R.: *Woronov 149* (W).

A. centrasiaticus: U.S.S.R.: *Schrenk s.n.* (W).

A. langsdorffii: U.S.S.R.: *Desoulavi 2951 A* (A, L, W).

10) *A. coloratus* would be distinct by having reddish purple spikelets. In fact this colouration is quite common and occurs usually in various gradations on the sides of the spikelets turned towards the sun. This has therefore more to do with the illumination of the plant and the maturity of the spikelet than with taxonomy. It is not surprising that such forms are most common in tropical Africa and Malesia.

Representative specimens:

Ethiopia: *Schimper 1532* (L, P, W); India: *Hook. f. & T. Thomson s.n.* (A, W); Java: *Breemen s.n.*, 19 July 1925 (L); Lesser Sunda I.: *Elbert 1720* (L); Celebes: *Bünnemeijer 11326* (L); Philippines: *Merrill 11695* (L, P, W).

11) *A. pallidus* is based on poor, wilted pale specimens, possibly from shaded poor soil. It is only known from Papua New Guinea (2 collections: *Clemens s.n.*, the type; and *Pullen 1623* which appears to have gained its colour by the way it was dried; both in L). Except for the pale colour there is no way to distinguish them.

12) *A. quartininanus* var. *monostachyus* is also based on depauperate specimens, in which only one spike is developed. Such famine-forms merit no distinction.

Representative specimens: Japan: *Tsukamoto s.n.*, 1931 (TI); Lesser Sunda I.: *Elbert 1194, 1230, 1720* (L).

13) Some other noteworthy aberrations are:

- a) The uppermost spikelets of the type of *A. okamotoi* (*Okamoto s.n.*, KYO) and of several plants from Mauritius (*A. mauritianus*) are accompanied by a stipe with a minute glume, the remnant of the pedicelled spikelet which is otherwise not developed in this species (See also note 8).
- b) One of several specimens collected by *Pullen (3012, L)*, from Papua New Guinea, has in the top of the spikes either normal, solitary, uni-aristate sessile spikelets; or solitary, bi-aristate sessile spikelets were the lower lemma bears a perfect c. 7.5 mm long awn, also; or paired spikelets, the sessile ones uni-aristate, the pedicelled ones well-developed, uni-aristate with glumes and lemmas. In the latter no anthers were seen, nor lodicules, but those may have been present; there were no ovaries.
- c) A plant from Japan, *Nakai 2819* (KYO), has the awn inserted about halfway the lemma, contrary to the generic definition.

b. var. *junnarensis* (Jain & Hemadri) Welzen, *stat. nov.*, *comb. nov.* — Fig. 5, Map 2.

A. junnaensis Jain & Hemadri, J. Bombay Nat. Hist. Soc. 68 (Apr. 1971) 300; Jain, J. Ind. Bot. Soc. 51 (1972) 175, pl. 16. — Type: *Hemadri 106849* (CAL, *n.v.*; i s o in K, L; BSI, LE, MO, *n.v.*) India, Maharashtra state, Poona district, Warsubai plateau, 16 km West of Junnar.

A. pusillus Bor, J. Ind. Bot. Soc. 50 a (Dec 1971) 92. — Type: *Vesey-Fitzgerald 12364/7* (BM; i s o in K) Arabia, Dhufar, Jabel Qara.

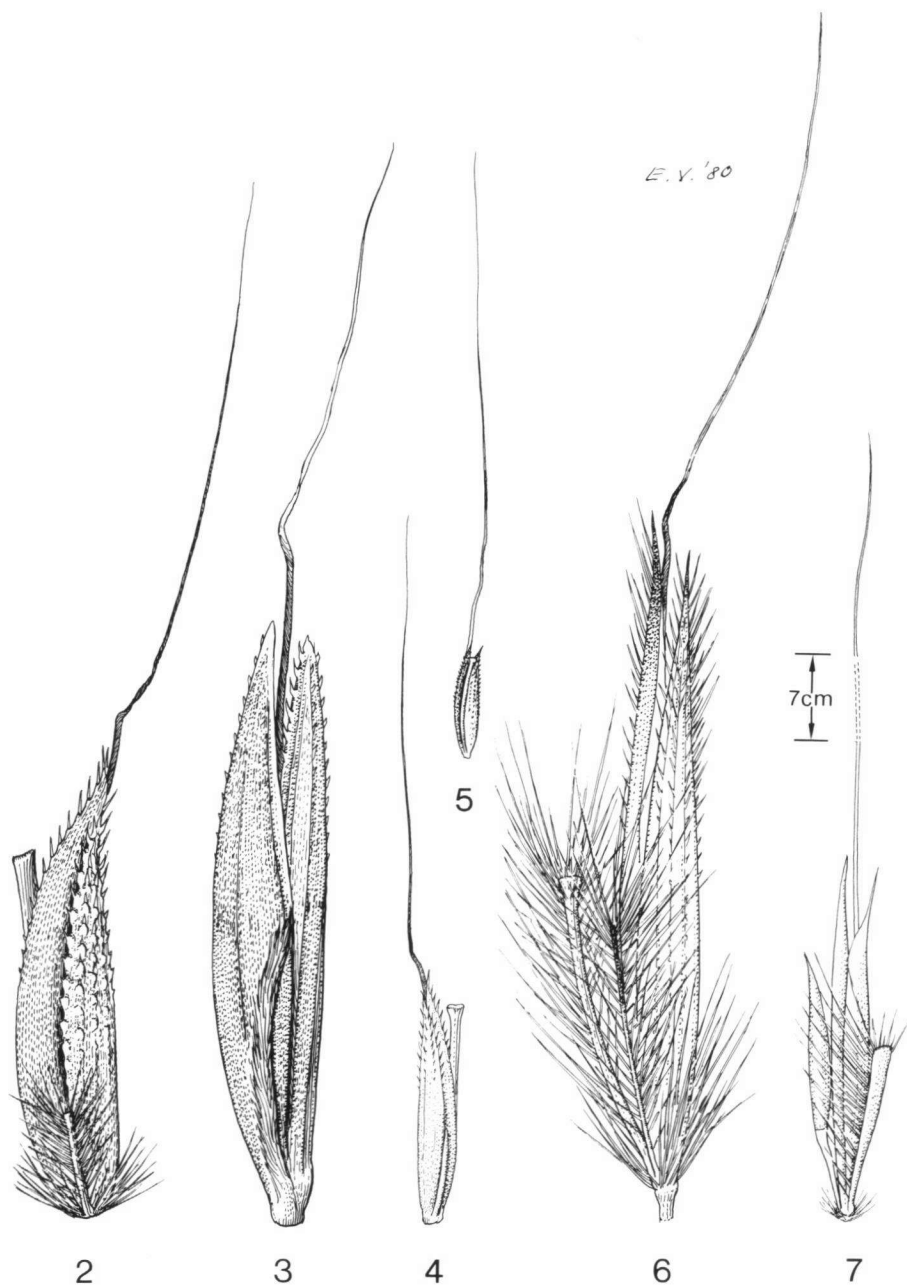


Fig. 2–7. Spikelets. All $\times 12$. — Fig. 2. *A. castratus* (Backer 36021). — Fig. 3. *A. depressus* (Wight KD 3372, type). — Fig. 4. *A. hispidus* var. *hispidus* (Wallich 8835 a, type of *A. nudus*). — Fig. 5. *A. hispidus* var. *junnarensis* (Radcliffe-Smith 5092 a). — Fig. 6. *A. hispidus* var. *santapaui* (Santapau 11450, type). — Fig. 7. *A. jubatus* (McCann 9787).

Herb up to 31 cm high. *Leaf-blades* 0.6–2.4 by 0.2–0.7 cm; margin in lower 0.3d with bulbous-based hairs. *Peduncle* c. 0.2 mm Ø. *Inflorescence* 0.7–1.7 by 0.2–0.8 cm. Joints 0.6–1.5 mm long, about 0.6–0.8 times as long as the spikelet, glabrous to sparsely pilose all over. *Spikelets* ovate-oblong, 1–1.8 by 0.3–0.6 mm. *Lower glume* 0.9–1.6 by 0.2–0.4 mm, on the back in upper 0.5–0.7th part with small spicules on the nerves; upper glume 0.9–1.7 by 0.3–0.4 mm. *Lower lemma* sometimes absent. *Anthers* 2, 0.2–0.4 by c. 0.1 mm. Pedicelled spikelet absent.

Distribution: Muscat & Oman (Dhufar); India (Maharashtra).

This is a strange, disjunct distribution, maybe either the result of an introduction in either Arabia or in India, or due to the desiccation of the intermediary area (the Middle East was thousands of years still green and offered a suitable dispersal area). The var. *santapau* shows the same distribution. Clayton & Panigrahi, Kew Bull. 29 (1974) divided the distribution patterns of several Indian grasses into classes. The distribution of var. *junnarensis* and var. *santapau* forms a small part of their Sahara-Sindian Region (p. 675, map p. 679).

Ecology: On floor of monsoon forest; in storied wadi-beds, on open glades; in zone of transition from grassland to woodland; on open plateau in shade of *Euphorbia neriifolia* L. bushes. Sometimes a co-dominant grass. 90–1000 m alt.

Collector's notes: Much-branched grass up to 25 cm high. Culm wiry, purplish. Leaves pale-green to green. Spikes tawny, light-green.

Note: The Indian plants of this variety differ somewhat from the Arabian ones. The first often lack the lower lemma and have somewhat larger, more herbaceous glumes; while the latter always possess a lower lemma and have smaller, more chartaceous glumes.

c. var. robustior Welzen, nom. nov., stat. nov. — Fig. 15, 16, Map 2.

Lucaea typica Buse in Miq., Pl. Jungh. (Aug. 1854) 467. — *L. junghuhnii* Nees ex Steud., Syn. 1 (Nov 1854) 414, nom. superfl. — *A. junghuhnii* Hochst., Flora 39 (1856) 189, nom. superfl.; Hack., Mon. Androp. (1889) 349. — *Pleuroplitis major* Arn. ex Miq., Fl. Ind. Bat. 3 (1857) 481 (excl. Wight KD 2589, fide var. *hispidus*), nom. superfl. — *Pl. junghuhnii* Nees ex Regel, Bull. Ac. St. Petersb. 10 (1866) 377 (spec. dub.), nom. superfl. — *A. typicus* Koord., Exk. Fl. Java 1 (1911) 110; Back. & van Slooten, Theeonkr. (1924) pl. 40; Back., Handb. Fl. Java 2 (1928) 74; Back. in Heyne, Nutt. Pl. ed. 3, 1 (1950) 179; Monod de F. in Back. & Bakh. f., Fl. Java 3 (1968) 605. — **Lectotype:** *Junghuhn s.n.* (L, no. 903.342–356, here proposed) Java, Merapi.

A. lanceolatus auct. non Hochst.: Koord., Nat. Tijdschr. Ned.-Ind. 62, 3 (1902) 241; Nat. Tijdschr. Ned.-Ind. 63 (1904) 38, 50.

Herb up to 65 (–200) cm high. *Leaf-blades* 4.5–19.5 by 0.9–2.2 cm; margin at least in lower 0.8th with bulbous-based hairs. *Peduncle* 0.6–1.3 mm Ø. *Inflorescence* 3.8–11.8 by 2.2–6 cm. Joints 2.7–6.5 mm, about 0.5–0.8 times as long as the spikelet, sparsely pilose all over. *Spikelets* ovate-linear-lanceolate, 5.1–7.8 by 0.8–1.7 mm. *Lower glume* 4.3–6.6 by 0.6–1.1 mm, in upper 0.3d part with small to 0.4 mm long spicules on the nerves; upper glume 4.9–7.7 by 0.6–1.1 mm. *Lower lemma* always present. *Anthers* (2 or) 3, 2.4–3.5 by 0.3–0.8 mm. Pedicelled spikelet absent.

Distribution: Java (Kedu, Semarang, Surakarta, Madiun, Malang, Besuki); Lesser Sunda Is. (Bali, Flores).

Ecology: On sunny to slightly shaded grassy areas and Tjemara-woods, along

road-edges and along terraces. Scattered to locally abundant. 1250–2600 m alt.

Vernacular names: Java: *blabah*, *blėbah*, *krėpah*, *rėbė*, *rumpu*, *sukėt kėtėh*, *s. pėkėtėh*, *s. sadar* (Jav.); *rėbha mar-kalemaran* (Mad.). Flores: *n-g'kor* (Manggerai).

Uses: Where common highly appreciated as a fodder because of the large leaves. Feeding value less than average (Backer, 1950).

Collector's notes: Spikelets pale-green. Lemmas with one purplish margin. Anthers blackish. Stigmas greenish white, hairs purple.

Note: This variety seems distinct because of correlating features, which together give the plants a different aspect than is observed elsewhere in the species.

On the Lesser Sunda Islands specimens have been collected, which appear slightly intermediate with the 'normal' var. *hispidus*, e.g. by being somewhat smaller and by having two anthers, while in Java there are always three. In Java the smallest plants are found at the highest altitudes and thus also become somewhat similar to var. *hispidus*.

Wight KD 2589 (K, U) and *C. B. Clarke 45720 D* (W), both from India, are also robust plants with somewhat larger leaves, but both are otherwise 'typical' var. *hispidus*.

d. var. *santapau* (Bor) Welzen, comb. nov., stat. nov. — Fig. 6, Map 2.

A. santapau Bor, Kew Bull. 1951 (1952) 446; Grasses (1960) 102; Jain, J. Ind. Bot. Soc. 51 (1972) 181. — **Type:** *Santapau 11450 A* (K) India, Bombay, Purandhar Fort.

Herb, up to 15 cm high. *Leaf-blades* 1.7–5.3 by 0.4–1.5 cm; margin with bulbous-based hairs in the lower 0.3–0.8th. *Peduncle* c. 0.3 mm Ø. *Inflorescence* 2–4 by 0.4–1.8 cm. Joints 2.1–3.4 mm long, c. 0.4 times as long as the spikelet, densely long (up to 1.7 mm)-pilose all over. *Spikelets* ± linear-lanceolate, widest just above the base, 5.4–8.4 by 1–1.1 mm. *Lower glume* 4.8–7.5 by 0.7–0.8 mm, dorsally usually densely spiculate all over, also between the nerves; upper glume 5.2–8.3 by 0.6–0.7 mm. *Lower lemma* always present. *Anthers* not seen, probably 2. Pedicelled spikelet absent.

Distribution: Muscat & Oman (Dhufar); India (Himachal Pradesh, Maharashtra). See also distribution of var. *junnarensis*.

Ecology: Occasional on floor of monsoon-forest. Co-dominant in open glades, upland-grassland. Sometimes between roots of *Ischaemum impressum* Hack. 1000–1500 m alt., probably also at lower altitudes.

Collector's notes: Forming a close, rather low mat over ground.

Note: This variety is distinct by its relatively short, long-pilose joints; large spikelets, and lower glumes which usually are densely spiculate.

4. *Arthraxon jubatus* Hack. — Fig. 7, Map 1.

A. jubatus Hack., Mon. Androp. (1889) 358; Hook. f., Fl. Br. Ind. 7 (1897) 147; Jain, J. Ind. Bot. Soc. 51 (1972) 174, pl. 9. — **Type:** *Stocks s.n.* (W; iso in L; CAL, n.v.) India, Malabar, Concan, regio tropicalis.

Annual herbs, slender. *Culms* up to 22 cm high, glabrous; nodes pubescent. Sheaths densely pilose with patent often bulbous-based hairs. Ligule 0.4–0.7 mm

high. *Blades* 1.4–3.9 by 0.3–0.6 cm, margins in lower part with bulbous-based hairs, upwards becoming ciliate; upper- and lower surface densely pilose. *Peduncle* probably not yet present (see note). *Inflorescence* still enclosed in uppermost sheath. *Joints* 4–5.1 mm long, distally slightly thickened, laterally with patent bulbous-based hairs. *Spikelets* in pairs, the pedicelled ones ♂. *Sessile spikelets* 6–8.4 by 0.8–1.6 mm; callus with 1–1.6 mm long hairs; between callus and sessile spikelet a short pedicel, 0.4–1 mm long. *Glumes* unequal, chartaceous except for the margin of the upper glume; lower glume rounded on the back, 5.9–7 by 0.4–0.5 mm, 2–4-nerved, margins not inflexed, flat, nerves with very small spicules all over; upper glume 6–7.5 by 0.8–1 mm, 3-nerved, margin 0.3–0.4 mm wide, glabrous. *Lower lemma* 1.6–2.2 by 0.1–0.2 mm, nerveless; upper lemma 2.2–3.9 by 0.4–0.6 mm, 1-nerved, awn straight, scabridulous, column with 5 coils, 1.8–4.6 cm long, hardly distinct from the 5.7–9.3 cm long subule. *Palea* absent. *Lodicules* 0.2–0.4 by 0.2–0.4 mm. *Anthers* 3, 0.7–1.3 by 0.1–0.2 mm. *Styles* 0.9–1.5 mm long; stigmas 0.6–1.2 mm long. *Caryopsis* not seen. *Pedicelled spikelet* ovate-linear-lanceolate, 3.9–5 by 0.6–0.8 mm; stipe 1.7–2.6 mm, long-pilose. *Glumes* usually equal; lower glume 3.9–5 by 0.3–0.5 mm, inconspicuously 4–7-nerved; upper glume 3.8–5 by 0.3–0.8 mm, 3-nerved. *Lower lemma* 1.7–2.3 by 0.1–0.3 mm; upper lemma 0.8–1.8 by 0.1–0.2 mm. *Lodicules* c. 0.2 by 0.2 mm. *Anthers* 3, not yet fully developed.

Distribution: India (Maharashtra, Kerala).

Ecology: On vertical rocks, in dense clumps or rather forming a close mat on the rocks.

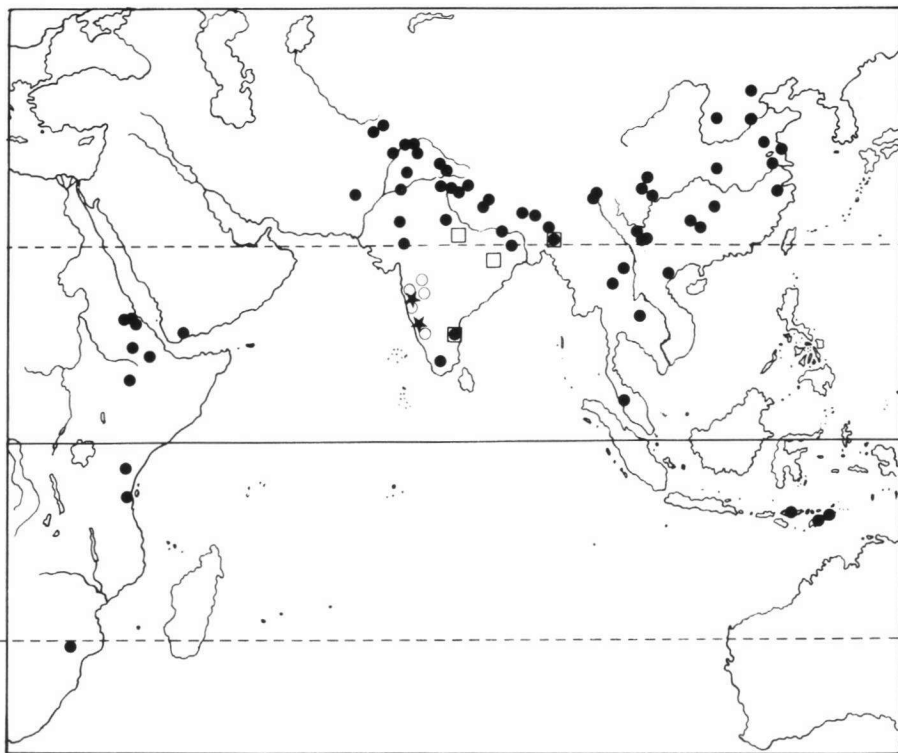
Collector's notes: Blades generally deep brown.

Note: All specimens seen still had their inflorescences included in the sheaths. So, either by chance they were all juvenile, or this is actually a distinctive character of this curious taxon.

5. *Arthraxon lanceolatus* (Roxb.) Hochst.

For literature see under the varieties.

Perennial herb, ± robust, sometimes ± bulbous-based, than culms usually simple. Cataphylls sometimes present, lanceolate, c. 1.9 by 0.4 cm, apex rounded, silky-pilose. *Culms* up to 75 cm high, glabrous to puberulous (especially at base); nodes glabrous to pubescent. Sheaths glabrous to sparsely pilose with bulbous-based (often deciduous) hairs, which distally increase in number. Ligule 0.6–4.0 mm high, usually with 0.1–3 mm long hairs on the margin and sometimes also on the back. *Blades* 1.1–8.5 by 0.3–1.9 cm; margins with bulbous-based hairs (rarely in lower 0.3d only and then ciliate in the upper part); upper- and lower surface either glabrous or puberulous in the throat or puberulous all over (hairs less than 0.1 mm long) to sparsely covered with bulbous-based hairs. *Peduncle* 5.5–23.5 cm long, glabrous to shortly appressed (to somewhat patently) pilose. *Inflorescence* 1.2–9.3 by 0.2–5 cm, with 1–6 branches and 1–many spikelets, longest lowest branch 1.2–8.8 cm long; joints 2.5–5.7 mm long, laterally with up to c. 3 mm long white hairs, dorsally with rows of short hairs. *Spikelets* in pairs, the pedicelled ones ♂. *Sessile spikelet* 4.2–9.5 by 0.5–2.2 mm; callus with 0.1–2.7 mm long hairs. *Glumes* chartaceous, with membranous margins; lower glume slightly rounded on



Map 3: Distribution of: ● = *A. lanceolatus* (Roxb.) Hochst. var. *lanceolatus* (taxon 5a); □ = var. *echinatus* (Nees) Hackel (taxon 5b); ★ = var. *meeboldii* (Stapf) Welzen (taxon 5c); ○ = var. *raizadade* (Jain, Hemadri & Deshpande) Welzen (taxon 5d).

the back, 4.1–8.9 by 0.3–1 mm, margins inflexed, glabrous, 5–10 nerved, marginal and submarginal nerves usually with broad-based spicules, these with or without 1–several apical stiff hairs; marginal nerves rarely with densely setose wings; other nerves in the upper third with small spicules, rarely all beset with broad-based ones, dorsally sometimes appressed-puberulous or long-pilose; upper glume 4–9.4 by 0.5–1.3 mm, inconspicuously 3–5-nerved, margins 0.2–0.8 mm wide. *Lower lemma* 1.8–4 by 0.2–0.4 mm, nerveless; upper lemma 2.7–4.9 by 0.4–0.8 mm, 1(–3)-nerved, column with 2–15 coils, 4.2–10 mm long, smooth, subule 3.3–12.2 mm long. *Palea* absent. *Lodicules* 0.2–0.6 by 0.2–0.6 mm. *Anthers* (2 or) 3, 1.3–4.3 by 0.2–0.5 mm. *Styles* 1.3–3.9 mm long, stigmas 1.1–3.4 mm long. *Caryopsis* 2.7–4.9 by 0.3–0.5 mm. *Pedicelled spikelets* ovate-linear-lanceolate, 2.7–7.8 by 0.4–1.2 mm; stipe 1–3.4 mm long, long pilose. *Glumes* usually unequal, margins membranous; lower glume 2.7–7.8 by 0.2–0.7 mm, margins inflexed, 6–11-nerved, marginal nerves with longer spicules than the inner, in between sometimes puberulous or seldomly pilose; upper glume flat on the back, 3.2–7.3 by 0.2–0.8 mm, inconspicuously 3–5-nerved, chartaceous, except for the 0.1–0.6 mm wide margin, often with patent to retrorse white soft hairs. *Lemmas* 0(or 1)-nerved; lower lemma 1.9–4.9 by 0.2–0.5 mm; upper lemma

1.2–4.5 by 0.1–0.5 mm. *Lodicules* 0.2–0.5 by 0.2–0.5 mm. *Anthers* (2 or) 3, 1.6–4.8 by 0.2–0.7 mm.

Note: *A. lanceolatus* as accepted here shows in India some closely related varieties: var. *echinatus*, var. *meeboldii*, var. *raizadae*, and var. *villosus* (and maybe *A. deccanensis*, see nomina dubia). They differ from var. *lanceolatus* in the armament of the lower glume of the sessile spikelet. These four taxa are maintained here, because the differences with var. *lanceolatus* are too small to regard them as species, but they are constant and no intermediate forms seem to occur. It must be pointed out, however, that only very few collections of these varieties have been seen from sometimes scattered localities (see distribution of var. *echinatus*).

The varieties *lanceolatus*, *meeboldii*, *raizadae*, and *villosus*, from Mysore and Maharashtra, show a kind of evolutionary sequence in the pubescence and scabrousness of the lower glume of the sessile spikelets. In var. *lanceolatus* there are broad-based spicules on the marginal and submarginal nerves, which bear no hairs or only a single stiff one. In var. *meeboldii* those spicules bear bundles of stiff hairs. These bundles are also present in var. *raizadae* of which the glume has a villose back (former two were glabrous or shortly pilose); just like var. *villosus*, this variety has the broad-based spicules of the marginal nerves (absent on the submarginal) united into wings with many stiff hairs along their margins. The var. *echinatus* (and possibly *A. deccanensis*) certainly developed from var. *lanceolatus*, but as they are found in totally different areas of India, it seems logical to assume that they both developed polytopically. Var. *echinatus* has broad-based spicules on every nerve of the glabrous lower glume of the sessile spikelet, instead of the marginal and submarginal ones only. *A. deccanensis* is said to have longer broad-based spicules on the marginal and submarginal nerves.

a. var. *lanceolatus*. — Fig. 8, Map 3.

A. lanceolatus (Roxb.) Hochst., *Flora* 39 (1856) 188; Hack., *Mon. Androp.* (1889) 347 (incl. var. *genuinus* and subvar. *typicus*, *nom. inval.*); O. Ktze, *Rev. Gen. Pl.* 2 (1891) 760 ('*lanceolatum*'); Dur. & Sch., *Consp. Fl. Afr.* 5 (1895) 704; Hook. f., *Fl. Br. Ind.* 7 (1897) 143; Rendle, *J. Linn. Soc. Bot.* 36 (1904) 361; Camus, *Fl. Gén. I.-C.* 7 (1922) 296; Ohwi, *Acta Phytotax. & Geobot.* 11 (1942) 163; Bor, *Grasses* (1960) 100; Gill., *Gard. Bull. Sing.* 19 (1962) 149; Ohwi, *Fl. Japan* (1965) 192; Gupta & Sharma, *J. Agr. Trop. Bot. Appl.* 18 (1971) 63; Jain, *J. Ind. Bot. Soc.* 51 (1972) 175, pl. 18; Mehra & Kalia, *Taxon* 24 (1975) 511. — *Andropogon lanceolatus* Roxb., [*Hort. Beng.* (1814) 6, *nom.*] *Fl. Ind.* 1 (1820) 262. — *Batratherum lanceolatum* Nees, *Edinb. New Phil. J.* 18 (1835) 181; Duthie in *Atk., Gazet. N.W. Prov. India* 10 (1882) 638. — *T y p e*: not indicated; *l e c t o t y p e*: *Roxburgh Icon. Ined.* 2019 (K; copy in L; cf. Bor, 1960) India. No specimen received from BM.

Andropogon serrulatus Link, *Hort. Berol.* 1 (1827) 241. — *T y p e*: *Hb. Link s.n.* (B, †) *Patria?* (*ex descr.*). [*Batratherum serrulatus* Hochst., *nom.: auct. div. in syn.* —] *Andropogon serrulatus* Hochst. ex A. Rich., *Tent. Fl. Abyss.* 2 (1851) 458, *non* Link (1827), *nom. superfl.*, see note 1. — *Andropogon prionodes* Steud., *Syn.* 1 (1854) 383; Maxim., *Bull. Soc. Imp. Nat. Moscou* 54 (1879) 68. — *A. serrulatus* Hochst., *Flora* 39 (1856) 188, *nom. superfl.*; Mattei, *Bol. R. Orto Bot. Palermo* 9 (1910) 40, *pro comb. nov.*; Stapf, *Fl. Trop. Afr.* 9 (1917) 163. — *A. lanceolatus* Hochst. subvar. *serrulatus* Hack., *Mon. Androp.* (1889) 348. — *A. lanceolatus* Hochst. var. *serrulatus* Dur. & Sch., *Consp. Fl. Afr.* 5 (1895) 704; Fiori, *Nuov. Giorn. Bot. Ital. n.s.* 47 (1940) 26, *pro comb. nov.* — *A. prionodes* Dandy in Andrews, *Flow. Pl. Sudan* 3 (1956) 399; Tateoka, *Am. J. Bot.* 52 (1965) 867, pl. 13; Bor, *Fl. Iran.* 70 (1970) 535; Gill., *Rev. Fl. Mal.* 3, *Gram.* (1971) 287, pl. 35a; Jain, *J. Ind. Bot. Soc.* 51 (1972) 179, pl. 19; Anon., *Icon. Corm. Sin.* 5 (1974) pl. 7224; Steen., *Bot. J. Linn. Soc.* 79 (1979) 125. — *L e c t o t y p e*: *Schimper 1117* (P, here proposed; i s o in A, L, W) *Abyssinia*. See note 1.

A. lanceolatus Hochst. subvar. *wallichii* Hack., *Mon. Androp.* (1889) 348. — *T y p e*: *Wallich 8830 A* (W; i s o in BM, K, IDC 7394) *Nepal*.

A. lanceolatus Hochst. forma *glaberrimus* Chiov. in Pirota, *Ann. R. Ist. Bot. Roma* 8 (1908) 278 ('*glaberrima*'). — *I s o t y p e s*: *Pappi 299*, *Eritrea, Saraë, Adi Gani*; *Pappi 1865*, *Eritrea, Oculé*

Cusai, Torrente Aini; *Pappi* 3849, 4192, 4558, Erithrea, Amasen, Dongollo presso Ghinda; *Tellini* 979, Erithrea, Amasen, da Halibaret ad Amba. (None seen, *ex descr.*).
A. lanceolatus Hochst. forma *puberulus* Chiov. in *Pirotta*, Ann. R. Ist. Bot. Roma 8 (1908) 278 ('*puberula*'). — *A. lanceolatus* Hochst. var. *puberulus* Mattei, Boll. R. Orto Bot. Palermo 9 (1910) 40 ('*puberulam*'). — *Lectotype*: *Pappi* 149 (BM, here proposed) Erithrea, Sareë, Gaza Gobo.

Sessile spikelets 4.2–8.3 by 0.5–2.2 mm; lower glume 7–10-nerved, marginal and submarginal nerves with broad-based spicules, without or with only a single stiff hair, all other nerves at most with small spicules or sparsely short-pilose; anthers 3, 1.8–4.3 by 0.2–0.5 mm.

Distribution: East Africa; South-West Arabia; from West-Pakistan to the east-coast of China and from Himalaya and North China to South-East Asia; Malesia: Malaya (Kedah) and Lesser Sunda I. (Flores, Timor).

Koorders (1903, 1904, see *A. hispidus* var. *robustior*) cited four collections for Java, with some doubt two from Ngadisari, one from G. Merbabu: *Büsgen* 191 (BO, wrongly cited as *Büsgen* 190), and one from G. Smeru: *Busse* 1757 (BO, *n.v.*). He is notorious for his misidentifications and it seems most likely that the specimens belong to *A. hispidus* var. *robustior*. *Büsgen* 191 is cited by him (1911) under *A. typicus*, a synonym of the latter.

Ohwi (1965) mentioned a collection, apparently naturalized, from Japan, Honshu, Omi, near Otsu (*n.v.*).

Van Steenis (1979) characterized the distribution of *A. lanceolatus* ('*A. prionodes*') as an Indo-Malesian wide-spread species, absent from the wet Sunda-shelf and from Australia; a distribution corresponding with the area of seasonal drought. When *A. lanceolatus* is found in the evergreen wet belt (for instance Malaya, Kedah), it is present in so-called dry pockets, small areas with a yearly drought. Some grasses with a similar distribution: *Aristida adscensionis* L.; *Eragrostis viscosa* (Retz.) Trin.; *Hyparrhenia newtonii* (Hack.) Stapf var. *newtonii*; *Streblochaete longiaristatum* (A. Rich.) Pilger.

Ecology: On sunny to slightly shaded road-sides, old wall-crevices, margins of openings in evergreen forest, along sawahs, on steep grasslands and amongst pines; on sandy soil, on limestone rock. On wet to dry, often poor soil. Rare to locally abundant in dense tufts. 30–2600 m alt.

Vernacular names: Somalia: *daggah-gor*, *horrajar* (SR); India: *petgai* (Blue Mts.), *ghugin* (Guj); Lesser Sunda I.: *hun pisu*, *kolun meogor* (Timor); Japan: *oni-kobunagusa*.

Uses: Used as a fodder, although not important, probably because of its low feeding-value. Preferred before flowering. (Naithani & Raizada, 1977).

Chromosome numbers: $n=8$ (Mehra & Kalia, 1975, a curious count); $n=18$ (Tateoka, 1965).

Notes: 1) As Hochstetter (1851) did not refer to *Andropogon serrulatus* Link, his combination is formally heterotypic and superfluous, although the use of the same epitheton suggests homotypy. Therefore the correct epitheton is *prionodes*.

2) *A. lanceolatus* is very variable, just as *A. hispidus*, and again the rate of pubescence of the leaf-blade, a character used by Hackel (1889) and Chiovenda (1908) to distinguish a number of infra-generic taxa, shows too many intermediate forms, thus preventing a delimitation on any taxonomic level.

3) Bor (1960) and Jain (1972) and others have distinguished *A. lanceolatus* from

A. prionodes (= *A. serrulatus*). According to them the lower glume of the sessile spikelet would show:

	<i>A. lanceolatus</i>	<i>A. prionodes</i>
Convexity of back	flat, or slightly rounded	rounded
Nerves	distinct	indistinct
Spicules on back	only broad-based ones on margins, sometimes with a few small ones in between.	besides broad-based ones, between the marginal nerves many more small ones or slightly pilose.

Most of the plants would belong to the widespread *A. prionodes*, and only a few to the 'true' *A. lanceolatus*, which then would appear to be restricted to only a part of India. A check of the material with above combinations of characters showed that many intermediates occur. It is therefore impossible to separate *A. lanceolatus* and *A. prionodes* in any satisfactory way.

4) Specimens from the Lesser Sunda Islands have less robust spicules on the marginal and submarginal nerves of the lower glume of the sessile spikelet, but as this is the only small difference, no taxonomical value has been given.

5) *Berthe-Friedberg s.n.* (L) from Timor has very reduced pedicelled spikelets which consist of a stipe and a lower glume only, and can be regarded as an aberrant specimen as there are no other differences with the present taxon.

b. var. *echinatus* (Nees) Hackel. — Fig. 9, Map 3.

A. lanceolatus (Roxb.) Hochst. var. *echinatus* (Nees) Hack., Mon. Androp. (1889) 348. — *Batratherum echinatum* Nees, Edinb. New Phil. J. 18 (1835) 181. — *Andropogon echinatus* Heyne ex Steud., [Nom. Bot. ed. 2, 1 (1891) 759, nom.]; Syn. 1 (1854) 383. — *A. echinatus* Hochst., Flora 39 (1856) 188; Heyne ex O. Ktze, Rev. Gen. Pl. 2 (1891) 759, pro comb. nov. ('*echinatum*'); Jain, J. Ind. Bot. Soc. 51 (1972) 173, pl. 20; Mehra & Kalia, Taxon 23 (1974) 806; Uniyal & Srivastava, J. Bombay Nat. Hist. Soc. 75 (1978) 524. — Lectotype: *Wight KD 1684* (K, here proposed) India.

A. spathaceus Hook. f., Fl. Br. Ind. 7 (1897) 145. — Lectotype: *Wight KD 3257* (K, here proposed, see note) India, Deccan Peninsula, Gunde Cottah Hill Fort, Cuddapah.

Sessile spikelets 5.2–6.6 by 0.9–1.7 mm; lower glumes 5(–7)-nerved, with broad-based spicules on all of them, glabrous; anthers 3, immeasurable (either too young or too old).

Distribution: India (Uttar Pradesh, Orissa, Andhra Pradesh, Assam); Nepal.

Ecology: Among quartzite boulders under light shade. 35 m alt. (in Daissa).

Collector's notes: Herb up to 60 cm high.

Chromosome numbers: $n=9$ (Mehra & Kalia, 1974).

Note: Hooker f. (1897) mentioned *Ritchie 796* in Hb. Munro (*n.v.*) as a syntype of *A. spathaceus*, but according to his description this plant lacks pedicelled spikelets and is probably *A. hispidus* var. *hispidus*.

See also note under the species.

c. var. *meeboldii* (Stapf) Welzen, stat. nov., comb. nov. — Fig. 10, Map 3.

A. meeboldii Stapf, Kew Bull. (1908) 449; Jain, J. Ind. Bot. Soc. 51 (1972) 105; 176, pl. 23. — Type: *Meebold 9132* (K) India, Concan, in open grassland on a hillside near Khandale.



Fig. 8–10. Spikelets. All $\times 12$. — Fig. 8. *A. lanceolatus* var. *lanceolatus* (Fung 21192). — Fig. 9. *A. lanceolatus* var. *echinatus* (Mooney 3614). — Fig. 10. *A. lanceolatus* var. *meeboldii* (Meebold 1077 a).

A. purandharensis Bharucha & Satyanarayan, J. Bombay Nat. Hist. Soc. 52 (1954) 481; Vegetatio (1954) 129; Jain, J. Ind. Bot. Soc. 51 (1972) 179; Raghavan e.a., J. Bombay Nat. Hist. Soc. 75 (1978) 937. — Type: *Bharucha 501* (Herb. Inst. Sc. Bombay, n.v.; is o in K, s.n.) India, Purandhar, 4000 ft.

Sessile spikelets 7.3–9.5 by 1–1.3 mm; lower glume 7-nerved, dorsally glabrous, marginal and submarginal nerves in respectively the upper 0.7th and 0.3th part with broad-based spicules, which are provided with bundles of stiff hairs, all other nerves at most with small spicules; anthers (2 or) 3, c. 2.6 by 0.5 mm.

Distribution: India (Maharashtra, Mysore).

Ecology: Open grassland on hillside; calcareous walls. 600–1200 m alt.

Notes: See also note under the species.

1) *A. purandharensis* would differ from *A. meeboldii* in the following characters (Bharucha & Satyanarayan, 1954):

	<i>A. purandharensis</i>	<i>A. meeboldii</i>
a) Blade	very large, many distinct nerves	smaller, few indistinct nerves.
b) Racemes	more and larger	less and smaller
c) Position of bundle-haired spicules	along whole margin	in upper part only
d) Anthers	2 or 3	3
e) Antherlength	half of those of <i>A. meeboldii</i>	

Characters a and b are very variable as is shown in the specific description of all other species and varieties and cannot be used for the separation of species. The presence of 2 stamens next to 3 stamens (d) is of no distinctive significance; in the pedicelled flowers 2-anthered ones are occasionally observed, instead of the 3 (per flower) usually encountered. The position of the bundle-haired spicules (c) turns out to be overlapping in the specimens seen. The length of the anthers (e), of which Jain (1972) thought that it was the only delimitating character, was measured by Bharucha on a young plant with the spikelets still hidden in the upper sheath; the isotype in K had similar young spikelets. *Meebold 10770* (K) with the small leaves of a 'real' *meeboldii*, also has immature spikelets with the short anthers of '*purandharensis*'. It is a well-known fact that in immature spikelets the anthers are often much smaller than at anthesis. No delimitation may therefore be based on such an observation.

2) Raghavan (1978) reports *A. purandharensis* (which he finds quite distinct from *A. meeboldii*) from Talacauvery (Coorg distr.); Kemmangundi, Abbe Falls, Bahur (Chimagalur distr.), and Jog Falls (Shimoga distr.).

d. var. **raizadae** (Jain, Hemadri & Deshpande) Welzen, *stat. nov.*, *comb. nov.* — **Fig. 11, Map 3.**

A. raizadae Jain, Hemadri & Deshpande, J. Ind. Bot. Soc. 51 (1972) 103; 180, pl. 21. — Type: *Hemadri 98585* (CAL, n.v.; is o in K, L; BLAT, BSI, LE, MH, MO, n.v.) India, Maharashtra, Satara district, Mahabaleshwar.

Sessile spikelets 5.8–7.2 by 1–1.3 mm; lower glume 6–8-nerved, dorsally densely pilose, marginal and submarginal nerves in upper 0.3–0.5th part with broad-based spicules, which are provided with stiff hairs; anthers 3, 2–3 by 0.4–0.5 mm.

Distribution: India (Maharashtra, Mysore).

Ecology: Growing in full sun along road-sides, on rocks, and in rock-crevices. Common.

Collector's notes: Annual, small herb up to 45 cm high. Racemes brown.

Note: See note under the species.

e. var. villosus (C. E. C. Fischer) Welzen, *stat. nov.*, *comb. nov.* — **Fig. 12.**

A. villosus C. E. C. Fischer, Kew Bull. (1933) 350; Jain, J. Ind. Bot. Soc. 51 (1972) 103; 182, pl. 22. — **T y p e:** *Bourne & Bourne s.n.* (K) India, Western Ghats, Bababudans.

Sessile spikelet *c.* 5.8 by 0.9 mm; lower glume 7-nerved, dorsally densely villose, marginal nerves winged, their edges with numerous patent stiff hairs; anthers 3, *c.* 1.3 by 0.3 mm.

Distribution: India (Maharashtra, Mysore; after Jain, 1972).

Note: See note under the species.

6. Arthraxon lancifolius (Trin.) Hochst. — **Fig. 13, Map 4.**

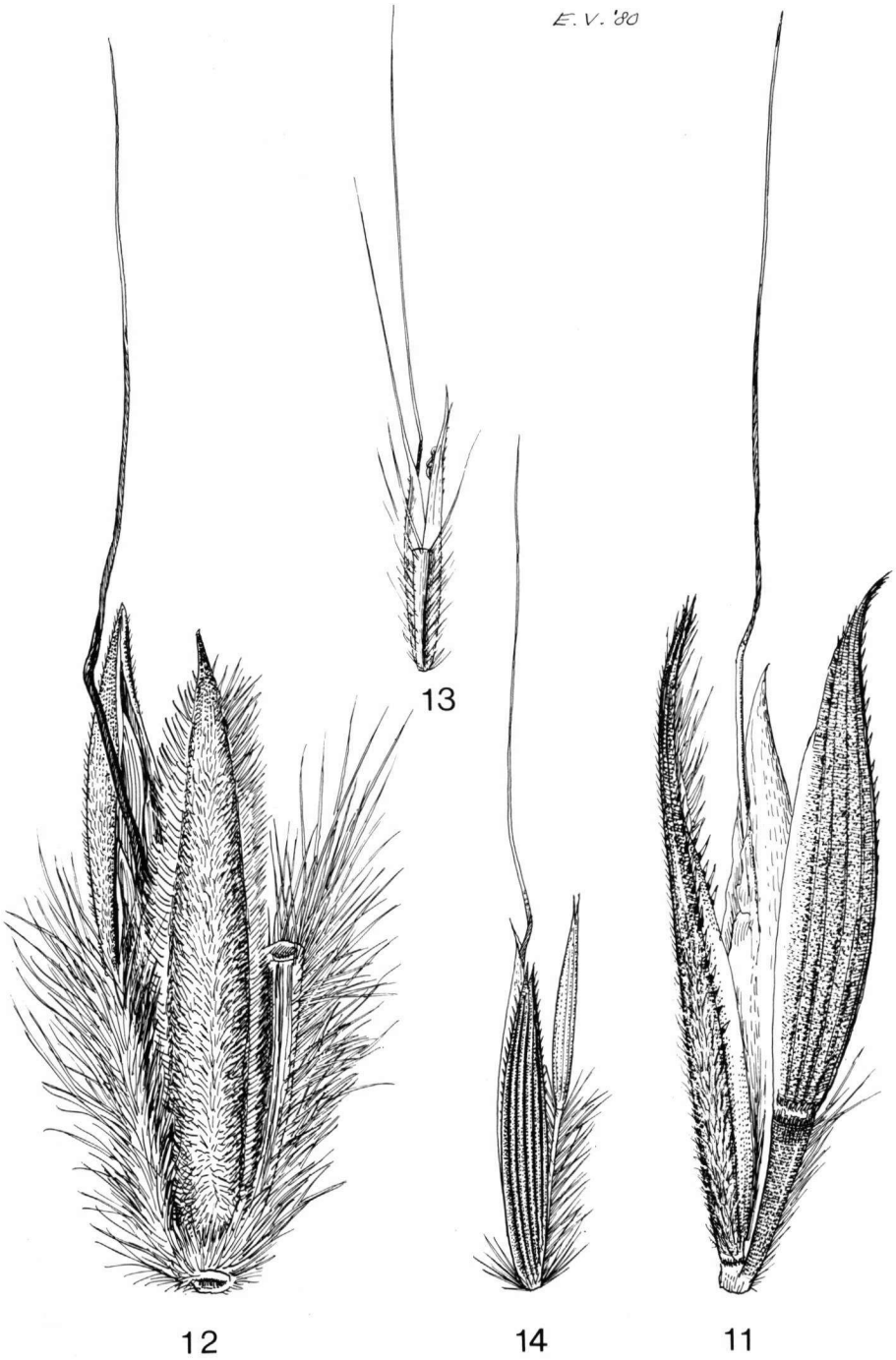
A. lancifolius (Trin.) Hochst., Flora 39 (1856) 188; Stapf, Fl. Trop. Afr. 9 (1917) 165; A. Chev., R v. Bot. Appl. Agric. Trop. 15 (1935) 1038; Henr., Blumea 4 (1941) 525; Bharucha & Satyanarayan, Vegetatio (1954) 130; Bor, Grasses (1960) 100; Metcalfe, Anat. Mon. 1 (1960) 43; Monod de F. in Back. & Bakh. f., Fl. Java 3 (1969) 605; Bor, Fl. Iran. 70 (1970) 534; Khosla & Songh, Libyan J. Sc. 1 (1971) 8 (n.v.); Jain, Ind. For. 97 (1971) 220; Mehra & Sharma, Taxon 21 (1972) 340; Jain, J. Ind. Bot. Soc. 51 (1972) 176; Bor, Ind. For. 98 (1972) 520; Mehra & Kalia, Taxon 24 (1975) 511; Steen., Bot. J. Linn. Soc. 79 (1979) 125. — *Andropogon lancifolius* Trin., M m. Ac. Sc. St. Petersb. VI, Sect. Math. Phys. Nat., 2 (1833) 271; Steud., Syn. 1 (1854) 382. — *Batratherum molle* Nees, Edinb. New Phil. J. 18 (1835) 181, *nom. superfl.* (incl. var. *majus* Nees, *nom. inval.*). — *Pleuroplitis lancifolia* Regel, Bull. Ac. St. Petersb. 10 (1866) 370, t. 10, pl. 11, 12. — *Batratherum lancifolium* W. Watson in Atk., Gaz. N.W. Prov. India 10 (1882) 392 (*'lancifolius'*). — *A. molle* Duthie, Grasses N.W. India (1883) 17, *nom. superfl.*; Balf., Trans. Roy. Soc. Edinburg 31 (1888) 315, *pro comb. nov.*; Dur. & Sch., Consp. Fl. Afr. 5 (1895) 704 (*'mollis'*). — *A. microphyllus* Hochst. var. *lancifolius* Hack., Mon. Androp. (1889) 350; Dur. & Sch., Consp. Fl. Afr. 5 (1895) 704. — *A. microphyllus* Hochst. forma *lancifolius* Back., Handb. Fl. Java 2 (1928) 73, status here appointed. — *A. lancifolius* Hochst. var. *lancifolius*: Jain, J. Ind. Bot. Soc. 51 (1972) 176, pl. 7. — **L e c t o t y p e:** *Wallich 8828 B* (LE; i s o i n A, K, L, W; IDC 7394, K neg. 11687) Nepal, fide Jain (1971).

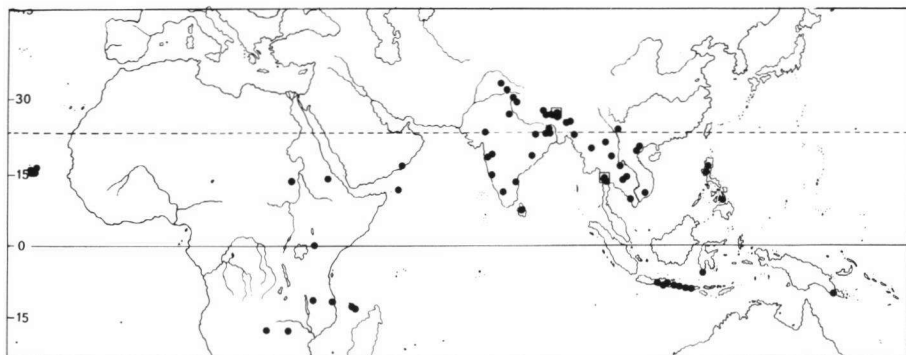
Batratherum molle Nees var. *tenue* Nees, Edinb. New Phil. J. 18 (1835) 182, *comb. ill.* — **S y n t y p e s:** *Royle 221* (LE; Merseyside County Mus. Hb., n.v.; K neg. 12378); *Royle 222* (LE, K; Merseyside County Mus. Hb., n.v.; K neg. 12379); *Royle 228* (LE; Merseyside County Mus. Hb., n.v.; K neg. 12380) Indiae montibus.

Psilopogon schimperi Hochst., [Flora 29 (1846) 117, *nom.*] ex A. Rich., Tent. Fl. Abyss. 2 (1851) 447. — [*Batratherum schimperi* Hochst., Flora 29 (1846) 117; Flora 39 (1856) 79, *nom.*] — *Andropogon multicaulis* Steud., Syn. 1 (1854) 383, *non Andropogon schimperi* A. Rich. (1851). — *Lucaea schimperi* Steud., Syn. 1 (1854) 414. — *A. minor* Hochst., Flora 39 (1856) 188, *nom. superfl.* — *Pleuroplitis schimperi* Regel, Bull. Ac. St. Petersb. 10 (1866) 369, t. 10, pl. 1–4. — **T y p e:** *Schimper 96 B* (TUB?, n.v.; i s o i n A, BM, L, W) Abyssinia, in locis umbrosis ad declivia rivularum juxta Adoua. See note on *Ps. capensis* (*nom. excl.*).

Fig. 11–14. Spikelets. All $\times 12$. — **Fig. 11.** *A. lanceolatus* var. *raizadae* (Hemadri 98585 G, i s o t y p e). — **Fig. 12.** *A. lanceolatus* var. *villosus* (Bourne & Bourne s.n., t y p e). — **Fig. 13.** *A. lancifolius* (Boivin s.n.). — **Fig. 14.** *A. microphyllus* (Garrett 840).

E. V. '80





Map 4: Distribution of: ● = *A. lancifolius* (Trin.) Hochst. (taxon 6) and □ = *A. microphyllus* (Trin.) Hochst. (taxon 7).

Pleuroplitis ciliata J. A. Schmidt, Beitr. Fl. Cap. Verde Ins. (1852) 152. — *Lucaea ciliata* Steud., Syn. 1 (1854) 414. — *A. schmidtii* Hochst., Flora 39 (1856) 189, *nom. superfl.* — Type: J. A. Schmidt s.n., Mar 1851 (W) Insulae Promontorii Viritis. Rupibus subhumidis in rupestribus lapidosis Insulae Sancti Antonii.

Psilopogon figarii de Not., Ann. Sc. Nat. III, Bot. 19 (1853) 370 ('figarei'). — *A. figarii* Aschers. & Schweinf. in Schweinf., Beitr. Fl. Aeth. (1867) 310. — Type: *Figari* s.n. (Fl, n.v.) In pascuis Nubiae, regione Kordofan (*ex descr.*). See note 2.

?*Pogonatherum tenue* Edgew., J. As. Soc. Beng. 21 (1852) 181. — Type: Edgeworth 706 (K, n.v.) India, Banda district, Banda rocks. (Fide Hook. f., Fl. Br. Ind. 7 (1897) 147, *in synon.*).

A. lancifolius Hochst. var. *birmanicus* O. Ktze, Rev. Gen. Pl. 2 (1891) 760 ('*lancifolium, birmanicum*'). — Type: 'Birma, Maulmein, an Kalkbergen' (NT?, n.v.; *ex descr.*).

A. microphyllus Hochst. forma *intermedius* Back., Handb. Fl. Java 2 (1928) 73, status here appointed. — Type not indicated, lecto: *Backer 30754* (BO, here proposed) Java, Besuki residentie, Noordhelling van de Gunung Idjen, boven Bajeman.

A. linifolius Henr., Blumea 4 (1941) 525; Reeder, J. Arn. Arb. 29 (1948) 380, *in nota*; Henty, Bot. Bull., Lae 1 (1969) 32. — Type: *Carr 14643* (L; i s o in BM) Papua New Guinea, Boridi.

A. comorensis A. Cam., Bull. Soc. Bot. Fr. 98 (1951) 36. — Syn types: *Boivin s.n.* (P) Comores, Grande Comore; *Boivin s.n.* (P) Comores, Anjouan. See note 2.

A. lancifolius Hochst. var. *eremophilus* Bor., J. Ind. Bot. Soc. 50 a (1971) 95. — Type: *Vesey-Fitzgerald 12318/3* (BM; i s o in K, n.v.) Arabia, Dhufar, plain behind Splalaw. See note 3.

A. lancifolius Hochst. var. *hindustanicus* Jain & Deshpande, J. Ind. Bot. Soc. 51 (1972) 176, pl. 8. — Type: *Cherian 88557* (CAL, n.v.; i s o in K, L; BSI, n.v.) India, Goa, Kaisuva Fort near Chopora. See note 2.

A. microphyllus auct. non Hochst.: Hack., Mon. Androp. (1889) 351 (*incl. var. genuinus, excl. typo*); Dur. & Sch., Consp. Fl. Afr. 5 (1895) 704; Hook. f., Fl. Br. Ind. 7 (1897) 147; Hack., Philip. J. Sc. 1, Suppl. (1906) 265; Merr., Philip. J. Sc. 1, Suppl. (1906) 333; Merr. & Merritt, Philip. J. Sc. 5 (1910) 326; Koord., Exk. Fl. Java 1 (1911) 110; Stapf in Craib, Aberdeen Univ. Stud. 61 (1913) 34; Merr., En. Philip. Fl. Pl. 1 (1923) 42; Back., Handb. Fl. Java 2 (1928) 73 (*incl. forma genuinus, excl. typo*, status here proposed); Back. in Heyne, Nutt. Pl. ed. 3, 1 (1950) 178; Monod de F. in Back. & Bakh. f., Fl. Java 3 (1969) 605; Cufodontis, Bull. Jard. Bot. Nat. Belg. 40 (1970) 1388. See note 1.

Batratherum molle Nees var. *parvulum* auct. non Nees: Nees, Edinb. New Phil. J. 18 (1835) 182, *pro Royle* 220. See note 1.

Annual herb, slender. Culms up to 30 cm high, glabrous; nodes pubescent. Sheaths glabrous to pilose with \pm patent bulbous-based hairs, which increase distally in number. Ligule 0.3–2.4 mm high. Blades 0.6–5 by 0.2–1.2 cm; margins often with bulbous-based hairs, usually in the lower 0.3d (to all over), otherwise often ciliate; upper- and lower surface glabrous to short pilose to long pilose with bulbous-based (often deciduous) hairs. Peduncle 2.4–14.2 cm long, glabrous to distally pilose to pilose all over. Inflorescence 0.7–3 by 0.2–1.9 cm, with 1–13

branches, with 3—many spikelets, longest lowest branch 0.5—2.8 cm long; joints 0.8—3 mm long, lower ones glabrous, upper ones with white, up to 2.3 mm long hairs. *Spikelets* often only in upper part of inflorescence paired. *Sessile spikelets* 2.4—7.4 by 0.3—1.1 mm; callus with up to 2.1 mm long hairs, rarely glabrous. *Glumes* herbaceous to chartaceous (except margins of upper glume); lower glume rounded on the back, 2.1—4.8 by 0.2—0.5 mm, margins not inflexed, flat, apex sometimes acuminate, inconspicuously 3—8-nerved, nerves with small spicules in upper 0.3d part to rarely so all over, sometimes somewhat larger ones on the marginal and submarginal nerves; upper glume 2—4.8 by 0.3—0.6 mm (excl. awn), apex often awned, the awn up to 4.2 mm long (see note 2), glume inconspicuously 3(—5)-nerved, margin 0.1—0.4 mm wide. *Lower lemma* 0.5—2.5 by 0.1—0.2 mm, nerveless; upper lemma 0.7—3.3 by 0.2—0.4 mm, 1-nerved, column with 2—11 coils, 1—5.4 mm long, smooth, subule 2.9—12.2 mm long. *Palea* absent. *Lodicules* 0.1—0.4 by 0.1—0.2 mm. *Anthers* 2, 0.3—0.9 by 0.1—0.2 mm. *Styles* 0.3—0.9 mm long, stigmas 0.2—0.7 mm long. *Caryopsis* 1.7—3.5 by 0.1—0.4 mm. *Pedicelled spikelets* ♂ or sterile, ovate-linear-lanceolate, variously reduced or absent, then stipe minute, otherwise up to 3 mm long, laterally with long white hairs. *Glumes* usually unequal, membranous to chartaceous; lower glume 1.3—3.2 by 0.2—0.5 mm, inconspicuously 3—6-nerved, nerves with minute spicules; upper glume sometimes absent, 0.6—2.8 by 0.1—0.5 mm, inconspicuously 1—3-nerved. *Lower lemma* often absent or up to 1.6 by 0.3 mm; upper lemma often absent or up to 1.5 by 0.2 mm. *Lodicules* usually absent or up to 0.2 by 0.2 mm. *Anthers* usually absent or 2, then without pollen, up to 0.6 by 0.2 mm.

Distribution: Cape Verde Isles; East Africa; Muscat & Oman; Socotra; Comores; from India and Ceylon to South-East Asia; Malesia: Java, Lesser Sunda I. (Bali, Lombok, Sumbawa), Philippines, South-West Celebes, East Papua New Guinea.

In Malesia the species occurs in the areas with seasonal drought (van Steenis, 1979); compare the distribution of *Biophytum fruticosum* Bl. (Veldkamp, Fl. Mal. I, 7, 1, 1972, 165, map) and that of *A. lanceolatus* var. *lanceolatus*.

Ecology: On open to slightly shaded places, on old walls, on steep and exposed rocks, in crevices, on field borders, on decaying trunks, along paths; on loam and on sand. On dry to wet, often poor soil. Rare, locally common. From sealevel up to 2300 m alt.

Vernacular names: Java: *blabah*, *lumuta* (Jav.).

Uses: Of no use as a fodder, because of its low yield and low feeding value (Backer, 1950).

Collector's notes: Sheaths pale-green tinged with reddish purple above the nodes. Leaves pale-green with purple margins. Inflorescence brown. Spikelets light-green; reddish purple; silvery white; greyish green or brownish purple. Awn green, dark purple at base or reddish purple. Anthers reddish purple to pale-yellow or brownish when old. Styles white or light-green.

Chromosome numbers: $n=9$ (Mehra & Sharma, 1972); $n=10$ (Khosla & Song, 1971, curious count); $n=18$ (Mehra & Kalia, 1975).

Anatomy: See Metcalfe (1960).

Notes: 1) *A. lancifolius* and *A. microphyllus* are both distinct species, but have usually been lumped, because the type of *A. microphyllus* was not studied (Bor, 1972). Jain (1971) showed five differentiating characters, of which three show

overlap: the pilosity of the culm below the inflorescence, the number of panicles, and the indument of the joints. Two other characters, viz. presence or absence of the pedicelled spikelets and the nervation of the lower glumes, are distinctive. *A. microphyllus* has always paired spikelets, with a protruding nervation of the lower glumes, while *A. lancifolius* often lacks the pedicelled spikelets, in any case in the lower part of the inflorescence, while the lower glumes are inconspicuously nerved. Two more characters may be added: the pedicelled spikelet of *A. microphyllus* is very narrowly linear, consisting of a lower glume only, and is always without anthers; *A. lancifolius* has ovate-linear-lanceolate pedicelled spikelets, usually consisting of more than the lower glume only, sometimes with the abortive anthers present.

2) Jain (1972) described the var. *hindustanicus* of which the upper glume of the sessile spikelet has a long awn. There is a distinct disjunction in the length of the awn between Jain's specimens and that of most others. However, the type of *Psilopogon figarii* (Figari s.n., from Ethiopia), *d'Alleizette 8019* (L, from Vietnam), and the plants from the Comores have a long awn, too. Apparently this form occurs locally here and there and as there are no other distinctive features, it does not seem to warrant a taxonomical status.

3) The var. *eremophilus* was separated by Bor (1971) from *A. lancifolius* because it has both chasmogamous and cleistogamous spikelets, the latter hidden within the uppermost sheath. Within this genus both types are common, cleistogamous flowers can be recognized by the small anthers, which in fruit remain entangled in the stigmas, while the chasmogamous ones eject the anthers at anthesis, after which these soon drop off. Such cleistogamous forms merit no distinction, especially when both types are found on the same plant, like the type-specimen of var. *eremophilus*.

4) See also note sub *A. microphyllus*.

7. *Arthraxon microphyllus* (Trin.) Hochst. — Fig. 14, Map 4.

A. microphyllus (Trin.) Hochst., Flora 39 (1856) 188; Hack., Mon Androp. (1889) 351, *pro typo* (incl. var. *genuinus*, *nom. inval.*) Dur. & Sch., Consp. Fl. Afr. 5 (1895) 704, *pro typo*; Jain, Ind. For. 97 (1971) 220; J. Ind. Bot. Soc. 51 (1972) 178, pl. 12; Bor, Ind. For. 98 (1972) 520; Grasses, ed. 2 (1973) 1. — *Andropogon microphyllus* Trin., Mém. Ac. Sc. St. Petersb. VI, Sect. Math. Phys. Nat., 2 (1833) 275; Steud., Syn. 1 (1854) 382. — *Batratherum molle* Nees var. *parvulum* Nees, Edinb. New Phil. J. 18 (1835) 182, *comb. ill.*, *excl.* Royle 220. — *Pleuroplitis microphylla* Regel, Bull. Ac. St. Petersb. 10 (1866) 370. — *A. lancifolius* Hochst. var. *microphyllus* O. Ktze, Rev. Gen. Pl. 2 (1891) 760, *nom. superfl.* — *A. microphyllus* Hochst. forma *genuinus* Back., Handb. Fl. Java 2 (1928) 73, *pro typo*, *nom. inval.*, status here appointed. — *LECTOTYPE*: Wallich s.n. (LE, K neg. 11685) Nepal, cf. Jain (1971). *A. sikkimensis* Bor, Kew Bull. 1951 (1952) 447; Grasses (1960) 102; Behera e.a., J. Bombay Nat. Hist. Soc. 74 (1979) 651. — *TYPE*: Gammie 1079 (K) India orientalis, Sikkim, Lachung.

Annual herb, slender. Culms up to 30 cm high, glabrous; nodes pubescent. Sheaths glabrous to totally pilose with patent bulbous-based hairs. Ligule 0.4–2.5 mm high, fimbriate. Blades 0.3–1.7 by 0.1–0.4 cm; margins with bulbous-based hairs; upper- and lower surface pilose with bulbous-based hairs. Peduncle 1.7–9 cm long, glabrous. Inflorescence 0.7–2.3 by 0.2–0.7 cm with 1–3 branches and 3–22 spikelets, longest lowest branch 0.5–2.2 cm long; joints 1.2–2.4 mm long, lower joints glabrous, upper ones pilose all over. Spikelets paired, the pedicelled sterile. Sessile spikelets 2.8–3.9 by 0.4–0.6 mm; callus with 0.2–0.5 mm long white hairs. Glumes herbaceous to chartaceous (except the margins of the upper glume); lower glume rounded on the back, 2.6–3.2 by 0.3–0.4 mm, margin not inflexed, flat, nerves 6 or 7, very conspicuous, somewhat protruding, with spicules in the upper

0.3–0.7th part; upper glume 2.5–3.8 by 0.4–0.5 mm, 3(–5)-nerved, margins 0.2–0.4 mm wide. *Lower lemma* 1.6–2.1 by 0.2–0.3 mm, nerveless; upper lemma 1.7–2.1 by c. 0.3 mm, 1-nerved, column with 6–10 coils, 3.5–4.5 mm long, smooth; subule 4.4–6 mm long. *Palea* absent. *Lodicules* 0.2–0.3 by 0.2–0.3 mm. *Anthers* 2, c. 0.6 by 0.2 mm. *Styles* c. 0.7 mm long, stigmas c. 0.4 mm long. *Caryopsis* 2–2.1 by 0.4–0.5 mm. *Pedicelled spikelet* consisting of a lower glume only (*q.v.*); stipe 1.6–1.9 mm long, laterally pilose. Lower glume narrowly linear, rounded on the back, 1.9–2.2 by 0.2–0.3 mm, nerves 6, somewhat protruding with minute spicules.

Distribution: Nepal; Sikkim; Thailand (Northern: Chiang Rai).

Ecology: 2000–3500 m alt.

Chromosome numbers: $n=9$ (Behera e.a., 1979).

Note: The type-specimen of *A. microphyllus* is annotated 'Nepal Wallick (!) Rudge', of which I have not seen any duplicates elsewhere. The type was not studied by subsequent authors until Jain (1971) and Bor (1972), which resulted in a general misapplication of the name for the much more common and wide spread *A. lancifolius* (see synonymy of the latter). It is therefore not surprising that Bor (1952), when he studied *Gammie 1079*, thought he had a new species (described as *A. sikkimensis*). Jain was the first to discover the confusion and both he and Bor (1972) discussed the history and delimitation of *A. microphyllus*; see also for the differences between *A. lancifolius* and *A. microphyllus* sub *A. lancifolius*, note 1.

As *A. microphyllus* is such a rare and local species (7 collections seen; one more specimen attributed to Wallich is in LE, but was not received, see K neg. 11684), it seems unnecessary to invoke Art. 69.1 of the Code and to propose the name for rejection. Jain was followed by Bor (1972, 1973) and because of the authority of the latter it may be excepted that future literature will apply the names correctly.

NOMINA DUBIA

A. deccanensis Jain, J. Bombay Nat. Hist. Soc. 68 (1971) 297, pl. 296; J. Ind. Bot. Soc. 51 (1972) 165, pl. 17. — **Type:** *Patil 7825* (CAL, *n.v.*) India, Maharashtra, Poona district, Sinhadgad.

Distribution: India (Maharashtra).

Note: This species was said to differ from *A. lanceolatus* by its up to 1 mm long spicules on the marginal nerves of the lower glume of the sessile spikelet. As this is the only difference between *A. lanceolatus* and *A. deccanensis*, the latter is perhaps not even a variety of *A. lanceolatus*, but at most an extreme form of *A. lanceolatus* var. *lanceolatus*, because many specimens, all here considered to belong to var. *lanceolatus*, also show such relatively long spicules: *Campbell s.n.* (W), India; *Chiao 3057* (BM), China; *Dobremez 2778* (BM), Nepal; and *Duthie s.n.* (L), West Himalaya. (See also Addendum).

A. inermis Hook. f. var. *tzvelevii* Jain, Sc. & Cult. 37 (1971) 55; J. Ind. Bot. Soc. 51 (1972) 174, pl. 6. — **Type:** *Santapau 11361* (CAL, *n.v.*) India, Purandhar, Vazirghad Fort. =? *A. hispidus* var. *hispidus*.

Distribution: India (Maharashtra).

Note: This variety was said to have larger, 4–5.5 mm long, spikelets than var. *inermis*, of which the spikelets are 2.5–3(–3.5) mm long. In note 6 of *A. hispidus* var. *hispidus* it is discussed why *A. inermis* (var. *inermis*) is here regarded as a

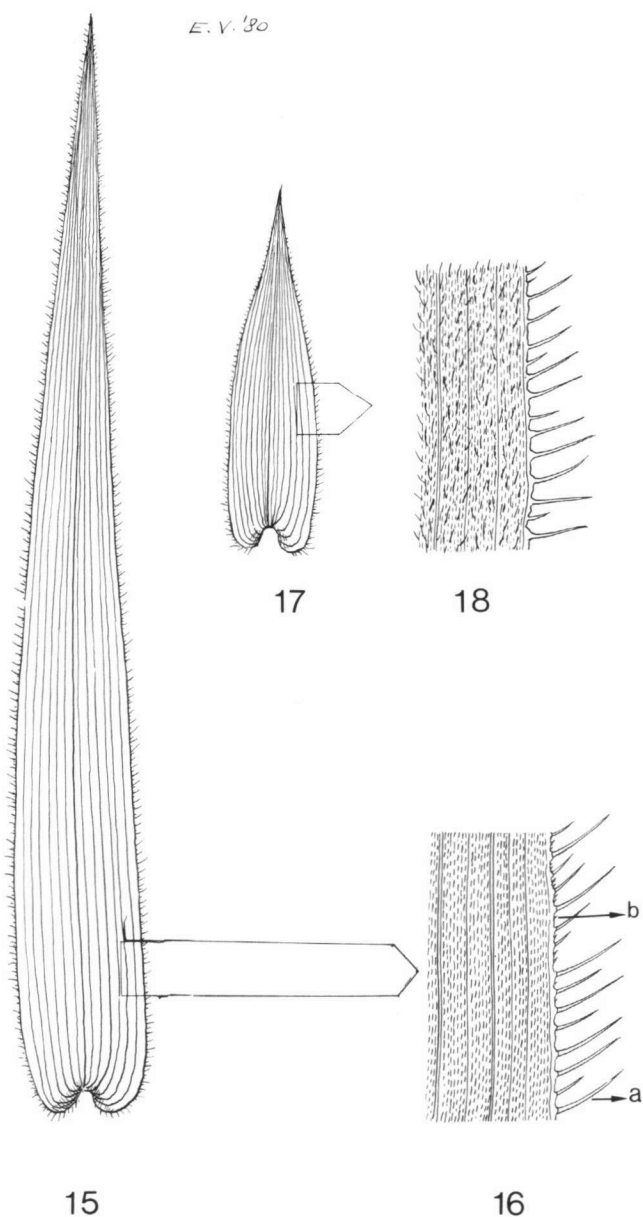


Fig. 15 and 16. *A. hispidus* var. *robustior* (Fosarie 38). — Fig. 15. Leaf-blade, $\times 1$. — Fig. 16. Detail of margin of leaf, $\times 12$. — a. Bulbous-based hair. — b. Spicule. — Fig. 17 and 18. *A. hispidus* var. *hispidus* (Chand 7969). — Fig. 17. Leaf-blade, $\times 1$. — Fig. 18. Detail of margin of leaf, $\times 12$.

synonym of *A. hispidus*. The same argumentation is probably applicable to var. *tzvelevii* also. Within the *A. hispidus*-complex no disjunctions in the length of the spikelets could be distinguished, see also note 7 sub *A. hispidus* var. *hispidus*. Therefore it is possible that var. *tzvelevii* is just a mere synonym of *A. hispidus* var. *hispidus*.

NOMINA EXCLUDENDA

A. rudis auct. non Hochst.: M. Schmid, Extr. Agron. Trop. 13 (1958) 199.

= *Thelepogon elegans* Roth.

Note: See note 2 sub *A. castratus*.

A. lanceolatus Miq., Ann. Mus. Bot. Lugd. Bat. 2 (1866) 288, non *A. lanceolatus* (Roxb.) Hochst. (1856); Prol. Fl. Jap. (1867) 176. — L e c t o t y p e: *Burger s.n.* (L, no. 908.83 – 1054, here proposed) Japan; s y n t y p e: *Pierot s.n.* (L, no. 908.83 – 1080) Japan, indeterminable.

= *Microstegium vimineum* (Trin.) A. Camus var. *imberbe* (Nees) Honda.

A. nodosus Kom., Acta Hort. Petrop. 18 (1901) 448; Honda, J. Fac. Sc. Imp. Univ. Tokyo III, Bot. 3, 1 (1930) 408, in synonym.; Chung, Korean grasses (1965) 148. — S y n t y p e s: *Komarov s.n.* (LE, n.v.) Corea, district Cza-schin, province Kengi, Sodegin-muri; and Jalu-dsian.

= *Microstegium vimineum* (Trin.) A. Camus var. *imberbe* (Nees) Honda.

N o t e: The description of this 'species' shows characters which do not agree with those of *Arthraxon*, e.g. a cuneate base of the leaf-blade, and the awn inserted in the upper 0.7th of the upper lemma. Honda has probably seen the syntype from Jalu-dsian, namely *Komarov 126* (TI, also seen by me), of which the label lacks the name *A. nodosus* (only *Pollinia imberbis* Nees is mentioned). Honda correctly determined this plant as the *Microstegium* mentioned above, with which above characters match much better.

Honda also mentioned *A. imberbis* in his list of synonyms of *M. vimineum* var. *imberbe*, which he also attributes to Komarov (l.c.), but was never described by the latter. The epithet *imberbis*, written on the label, was probably by mistake used by Honda to form the combination *A. imberbis*.

Lasiolytrum pilosum Steud. ex Jardin, Mém. Soc. Sc. Nat. Cherbourg 5 (1857) 299; Veldk., Blumea 21 (1973) 38, in synonym. — T y p e: *Jardin 59* (P, n.v.).

= *Digitaria setigera* R. & S.

Pleuroplitis producta Griseb. in Ledeb., Fl. Ross. 4 (1853) 478; Hack., Mon. Androp. (1889) 181, in synonym.

— T y p e: *Eschscholtz s.n.* (LE, n.v.) Philippines, Luzon.

= *Microstegium tenue* (Trin.) Jansen.

Psilopogon capensis Hochst., Flora 29 (1846) 117; Hack., Mon. Androp. (1889) 179, in synonym.; A. Camus, Ann. Soc. Linn. Lyon 68 (1921) 201, in synonym. — T y p e: *Krauss 92* (TUB?, n.v.) Cap und Natallandes, ad rivulos sylvarum, Knysma.

= *Microstegium capense* (Hochst.) A. Camus.

N o t e: In the footnote Hochstetter (1846) places *Psilopogon* (t y p e: *Ps. schimperii* Hochst.) into the synonymy of *Batratherum schimperii* Hochst. (= *Arthraxon hispidus* var. *hispidus p.p.* and *A. lancifolius p.p.*) and then reinstates a new genus *Psilopogon* (t y p e: *Ps. capensis* Hochst.). Because the first *Psilopogon* is a *nomen nudum* (I could not find any description of it), the second is valid. However, may any description of the first be found, the latter is illegitimate.

IDENTIFICATION LIST

The numbers refer to the taxa in the preceding enumeration. Unnumbered collections, of which many were studied, have not been included.

- Adams 6233: 3a; Ahles & Haesloop 51719: 3a; Aitchinson 246: 6; Allard 11068: 3a; d'Alleizette 8019: 6; ANU 469 (Walker): 3a; 2009 (Flenley): 3a; 2506 (id.): 3a; 5803 (Wheeler): 3a; 13021 (Wace): 3a; 13075 (id.): 3a; 15347 (Smith): 3a; Ayres 47: 3a.
- Babu 34037: 6; Backer 3398: 6; 9280: 1; 13180: 6; 13489: 3a; 13679: 3a; 13991: 1; 14518: 3a; 14522: 1; 14925: 1; 15567: 1; 15751: 3a; 16288: 3a; 22224: 3a; 22377: 3a; 22444: 1; 22856: 3a; 23025: 3a; 23881: 3a; 24160: 3a; 24538: 6; 25071: 3a; 25164: 6; 25339: 3a; 25669: 1; 30048: 3a; 30267: 3c; 30694: 3a; 30754: 6; 30767: 3a; 30881: 1; 30882: 3a; 31579: 1; 36021: 1; 36022: 3a; 36760: 3a; 36915: 6; 37116: 3c; 37117: 3c; Bakhuizen v. d. Brink 612: 3a; 911: 3a; 1209: 3a; 1490: 1; 2544: 1; 3690: 3a; 4036: 1; 4829: 1; 5347: 3a; 6429: 3a; 7812: 3a; Balansa 414: 5a; 1546: 3a; 1739: 3a; 1740: 3a; 1746: 6; Bartlett 6101: 3a; Perrier de la Bathie 11155: 3a; Beguin 34: 6; 55: 3a; v. Beusekom e.a. 3510: 6; 3594: 3a; 3752: 6; 3872: 3a; 4289: 3a; Bharucha 501: 5c; Bingham 576: 3a; Bisset 2611: 3a; 3064: 3a; 3201: 3a; Blackwood 167: 3a; Blomquist 10946: 3a; Blume 14: 3a; 15: 3a; Bohnhof 222: 3a; Boldingh XV K.B. (53) 8: 3a; Bole 317: 5d; Bologua 4: 3a; Bonati 7014 b: 3a; 8019: 3a; Bor 17051: 3a; 17060: 1; Bosser 8036: 3a; 11042: 3a; 16223 b: 3a; 17540: 3a; 19323: 3a; Bouton 1: 3a; G.65: 3a; Bowers 848: 3a; Bozeman e.a. 45166: 3a; Brass 4787: 3a; 10735: 3a; 30712: 3a; 32231: 3a; Bretschneider 1982: 5a; Brinkman 127: 3a; 293: 3a; 483: 3a; Brues 568: 3a; BS 175 (Ramos): 3a; 9087 (Clemens): 3a; 9233 (id.): 6; 38117 (Ramos & Edano): 3a; 40212 (id.): 6; 40483 (id.): 6; 40520 (id.): 3a; Bünnemeyer 2824: 3a; 4326: 3a; 11326: 3a; 11330: 3a; 11558: 6; Büsgen 191: 3c; Buwalda 7390: 3a.
- Carmichael 1: 3a; Carr 14643: 6; Catat 370: 3a; Chand 931: 6; 3823: 3a; 7969: 3a; 8300: 3a; 8309: 6; Charoenphol e.a. 4600: 6; Chen 533: 3a; Cherian 88557: 6; Chiao 3057: 5a; 12952: 5a; 18886: 3a; 22355: 3a; Chow 20: 5a; 8627: 3a; 8652: 3a; Cinatti 220: 5a; Clarke 6387: 3a; 10270: 7; 15645: 3a; 16599 b: 3a; 18240 b: 3a; 18476 a: 3a; 21189 b: 3a; 22556 b: 6; 23157 b: 3d; 24837 b: 3a; 25101 b: 6; 28436 c: 6; 31342 b: 5a; 33674 d: 6; 33675 d: 3a; 33679 h: 5a; 34131 a: 3a; 34418 a: 3a; 35843 b: 6; 36587 a: 3a; 40592 a: 5a; 40592 c: 5a; 40958 b: 3a; 41603: 3a; 43578 b: 3a; 43578 c: 3a; 45649 b: 3a; 45651 b: 6; 45720 d: 3a; Clason K.107: 6; Collett 30, 3: 6; 30,4: 3a; Correll & Blomquist 4885: 3a; Cruttwell 1587: 3a; 1593: 3a; 1599: 3a. Danser 6016: 1; 6447: 3a; 6802: 3a; Degener 32781: 3a; Delavay 1811: 3a; Demaree 34326: 3a; Desoulavi 2951: 3a; Dickason 6643: 6; Dobremez 1296: 3a; 2778: 5a; Doctors v. Leeuwen-Reijnvaan 2234: 3c; Duhamel 34: 3a; Dümmer 1218: 3a; Duncan 7893: 3a; 8926: 3a; 10549: 3a; 13312: 3a; Duss 39: 3a; 2712: 3a; 3136: 3a; Duthie 3570: 6; 6129: 5a; 6749: 5a; 6750: 3a; 6761: 3a; 6; 6853: 6; 7591: 5a; 7691: 5a; 10736: 6; 19824: 5a.
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- serrulatum* Hochst. 5a
- submuticum* W. Watson 3a

Chilochloa hispida Beauv. 3a

- Deyeuxia japonica* Speng. 3a
- Digitaria hispida* Spreng. 3a
- Dimeria scrobiculata* Koord. 3a

Ischaemum ciliare auct. non Retz. 3a*Lasiolytrum* Steud.

- hispidum* Steud. 3a
- pilosum* Jardin, nom. excl.

Leersia hispida Thunb. 3a*Lucaea* Kunth

- ciliata* Steud. 6
- gracilis* Kunth 3a
- junghuhnii* Steud. 3c
- langsдорffii* Steud. 3a
- major* Steud. 3a
- plumbea* Steud. 3a
- schimper* Steud. 6
- typica* Buse 3c
- violacea* Steud. 3a
- vriesii* Buse 3a

Microstegium Lindl.

- capense* A. Camus, nom. excl.
- tenue* Jansen, nom. excl.
- vimineum* A. Camus
- var. *imberbe* Honda, nom. excl.

Phalaris hispida Thunb. 3a*Pleuroplitis* Trin.

- caucasica* Trautv. 3a
- centrasiatica* Griseb. 3a
- ciliata* J. A. Schmidt 6
- lancifolia* Regel 6
- junghuhnii* Regel 3c
- langsдорffii* Trin. 3a
- var. *breviset* Regel 3a
- caucasica* Regel 3a
- centrasiatica* Regel 3a
- chinensis* Regel 3a

Pleuroplitis langsdorffii var.

- gracilis* Regel 3a
- submutica* Regel 3a
- typica* Regel 3a
- major* Miq. 3c
- major auct. non* Miq. 3a
- major* Regel 3a
- microphylla* Regel 7
- plumbea* Arn. 3a
- producta* Griseb., *nom. excl.*
- quartiniana* Regel 3a
- var. *caespitosa* Regel 3a

Pleuroplitis quartiniana var.

- tenella* Regel 3a
- typica* Regel 3a
- schimper* Regel 6
- Pogonatherum tenue* Edgew. 6?
- Pollinia ciliaris* Spreng. 3a
- Psilopogon* Hochst.
- capensis* Hochst., *nom. excl.*
- figarii* de Not. 6
- schimper* Hochst. 3a, 6
- Thelepogon elegans* Roth, *nom. excl.*

ADDENDUM

During printing a paratype of *A. deccanensis* Jain (*Ansari* 99978 a) was received from BSI. As was already suggested above (see *nomina dubia*), it is a form of *A. lanceolatus* (Roxb.) Hochst. var. *lanceolatus*, which should not be distinguished as a separate taxon.

I want to express my thanks to the Director of BSI for sending me this and other specimens.